بسم الله الرحمن الرحيم

Sudan University of Science and Technology

College of Graduate Studies

Role Of Human Resource Management on Attaining The Goals of Construction Projects in Sudan

دور إدارة الموارد البشرية في تحقيق اهداف تشييد المشروع في السودان

A thesis submitted in partial fulfillment of the requirements for the degree of Master in Construction Management

By:

Mohammed Muzzamil Elradi Elmuzzamil

Supervisor:

Dr. Awad Saad Hassan

April 2017

الآية

قال تعالى:

{آمَنَ الرَّسُولُ بِمَا أُنْزِلَ إِلَيْهِ مِنْ رَبِّهِ وَالْمُؤْمِنُونَ كُلٌّ آمَنَ بِاللَّهِ وَمَلائِكَتِهِ وَكُتُبِهِ وَرُسُلِهِ لا نُفَرِّقُ بَيْنَ أَحَدٍ مِنْ رُسُلِهِ وَقَالُوا سَمِعْنَا وَأَطَعْنَا غُفْرَانَكَ رَبَّنَا وَإِلَيْكَ الْمَصِيرُ (285) لا يُكَلِّفُ اللَّهُ نَفْسًا إِلاَّ وُسْعَهَا لَهَا مَا كَسَبَتْ وَعَلَيْهَا مَا اكْتَسَبَتْ رَبَّنَا لا تُؤَاخِذْنَا إِنْ نَسِينَا أَوْ أَخْطَأْنَا رَبَّنَا وَلا تَحْمِلْ عَلَيْنَا إِصْرًا كَمَا حَمَلْتَهُ عَلَى الَّذِينَ مِنْ قَبْلِنَا رَبَّنَا وَلا تُحَمِّلْنَا مَا لا طَاقَةَ لَنَا بِهِ وَاعْفُ عَنَّا وَاغْفِرْ لَنَا وَارْحَمْنَا أَنْتَ مَوْلانَا فَانْصُرْنَا عَلَى الْقَوْمِ الْكَافِرِينَ (286)}

صَدَقَ اللهُ العَظِيمُ

الآيتان (285) و(286) من سورة البقرة

Dedication

To my beloved parents

Acknowledgement

I would like to express my special appreciation to my supervisor Dr. Awad Saad Hassan for the guidance, assistance, criticism and suggestions on this research.

Appreciation is also extend to those contractors, consultants and owners who have participated with their opinion through the questionnaires which have distributed to them in Khartoum.

And also I would like to thank my family members and my friends, who gave me a lot of encouragement to complete this study.

Abstract:

This study exposed to the construction industry by focusing on the Concept of Human Resource Management especially training, motivation and recruitment and their affect on the goals of a project.

A set of questions have been exposed under the hypothesis of training, motivation and recruitment of labors , and their effect on the time quality and cost of a construction projects.

The research is divided into two parts the theoretical aspect established from different references (books, articles and researches) in the area of research and Scientific aspect which have been formulated by collecting data from companies of (construction, consultant) through a questionnaire.

95 copies have been distributed, and 72 copies have been collected then the obtained data have been analyzed by SPSS and coming up with recommendations and results.

The results of this research verified that Human Resource Management, specially motivation, training and recruitment have strong impact on the quality, time and cost of a construction projects, and there are certain recommendations have been come up with in the area of the research to make the participants in construction industry more aware by the importance of Human Resource Management and their positive effect on the goals of construction projects. .

المستخلص :

اجريت هذه الدراسة في صناعة التشييد و تحديدا ادارة الموارد البشرية لمعرفة مدي تأثير التدريب والتحفيز والاستقطاب علي اهداف مشاريع التشييد.

طرحت مجموعة من الاسئلة المتعلقة بفرضية ان تدريب , تحفيز واستقطاب العمالة ومدي تأثيرهم علي زمن , جودة و تكلفة مشاريع التشييد .

تم تقسيم هذا البحث الي قسمين جانب نظري حيث اطلع الباحث الي مجموعة من المصادر المتعلقة بمجال البحث (كتب ,مقالات و بحوث) وجانب عملي من خلال تصميم استبيان و توزيعه علي مجموعة شركات (مقاولين ,استشاريين).

تم توزيع 95 نسخة استبيان و تم استرجاع 72 نسخة لاحقا تم عمل تحليل احصائي للنسخ المسترجعة عن طريق برنامج (SPSS) و التوصل الي نتائج و توصيات.

تؤكد نتائج هذا البحث ان ادارة الموارد البشرية تحديدا التحفيز والتدريب والاستقطاب لهم تأثير فعال علي جودة , زمن وتكلفة مشاريع التشييد , و ايضا تم التوصل الي بعض التوصيات في مجال موضوع البحث لزيادة وعي المشاركين في صناعة التشييد الي مدى اهمية ادارة الموارد البشرية ومدي تأثيرها الايجابي علي اهداف المشروع الانشائي.

Table of Contents

الآية i
Dedication ii
Acknowledgement iii
Abstract: iv
المستخلص v
Table of Contents vi
List of Figures ix
List of Tables xi
CHAPTER ONE 1
INTRODUCTION AND RESEARCH COMPONENTS 1
1-1 Introduction: 1
1-2 Problem of the research: 1
1.3 Objectives of the research: 2
1.4 Questions of the research: 2
1.5 The importance of the research: 2
1.6 Research methodology: 2
1.7 Scope of the research: 3
1.8 Research Structure: 3
CHAPTER TWO 4
CONSTRUCTION INDUSTRY 4
2-1 Definition of construction industry: 5
2-2 The importance of the construction industry: 7
2-3 The nature of the construction industry: 7
2-4 Challenges in construction: 8
2-5 Sudanese Construction Industry: 9
2-5-1 Construction industry in Sudan: 10
2-6 Project success and project performance: 11

2-7 The construction industry elements: 12
2-8 The project in construction industry: 13
2-9 Project Teams: 14
2-10 Project Management for Engineering and Construction: 15
2-11 Management of construction projects: 16
2-12 Time: 18
2-13 Quality: 19
2-14 Money: 19
2-16 Factors affecting quality performance: 21
2-17 Human resources management: 22
2-18-1 Definition of human resources management: 22
2-18-2 Scope of HRM: 24
2-18-3 Barutçugil (2004), HRM aims (as quoted in Aray, 2008):.. 24
2-18-4 The importance of human resources management: 25
2-18-5 Affecting Factors on HRM : 27
2-18-6 Training: 28
2-19 Motivation: 28
2-19-1 Theories of motivation: 29
2-19-1-1 Maslow's Theory 29
2-19-1-2 Herzberg's Theory: 30
2-20 Employee motivation: 31
2-21 Types of Motivation: 31
2-22 Recruitment: 32
2-23 Human Resource Management in construction projects: 34
2-23-1 A short history of labor relations in construction: 34
2-23-2 Construction industry in Sudan: 35
2-23-3 Fundamentals of human resource management (HRM):..... 36
2-23-4 The challenges of managing people in construction: 37
2-23-5 Working Environments: 38

2-23-6 Wages and Benefit: 39
2-23-7 Career Prospects: 39
2-23-8 Construction Industry and HRM Practices: 40
2-23-9 Communication: 41
2-23-10 Staffing the structure with suitable people: 42
2-23-11 Role of HR managers: 42
2-23-12 project human resource management: 43
2-23-13 Project human resource management processes: 43
CHPTER THREE ……..……44
3-1 Methodology: ……44
3-2 Questionnaire Design: ……45
3-3 Data Collection: …….. 45
3-4 Research Sample: …….. 46
3-5 Research strategy: ……46
3-6 Data Analysis: …….. 47
CHAPTER FOUR 48
DATA ANALYSIS AND DISCUSSION 48
4-1 Part (1): General information:- 49
4-2 Part (2): Questions of the questionnaire: 54
CHAPTER FIVE 79
CONCLUSION AND RECOMMENDATIONS 79
5-1 Conclusion: 79
5-2 Recommendations: 80
5-3 recommendations for future: 80
REFERENCES 81
APPENDICES 85

List of Figures

Fig. (2. 1) The Construction Ind ustry (Offori G., 1990, p.20)..... 6
Fig. (2. 2) Project success (pheng and chuan,2006)..... 12
Fig. (2. 3) Project success (Kerzner, 2006)..... 17
Fig. (2. 4) Model of human resource management (Naoum, 2001)..... 23
Fig. (2. 5)): shows Maslow's Hierarchy of Needs success : A theory of Human needs (1943)..... 30
Fig. (4. 1) Frequencies - What are the types of sectors for the sample ..49
Fig. (4. 2) Frequencies – What are the businesses for the sample 50
Fig. (4. 3) Frequencies – How long have the sample dealing with construction projects 51
Fig. (4. 4) Frequencies- The size of the projects that the sample are working at..... 52
Fig. (4. 5) Frequencies- The level of education for the sample……..53
Fig. (4. 6) Frequencies- Recruitment and selection of qualified 54
Fig. (4. 7) Frequencies- Recruitment and selection of … etc 55
Fig. (4. 8) Frequencies- Recruitment and selection of qualified labors benefits … etc..... 56
Fig. (4. 9) Frequencies- Recruitment and selection … etc 57
Fig. (4. 10) Frequencies- Recruitment and selection of qualified labors reduce the waste of …… etc 58
Fig. (4. 11) Frequencies Recruitment and selection of qualified labors appear in the termination …….. etc..... 59
Fig. (4. 12) Frequencies- The recruitment and selection of labors according … etc 60
Fig. (4. 13) Frequencies- The work of recruited and .. etc 61
Fig. (4. 14) Frequencies-There is no reworking…….. etc..... 62
Fig. (4. 15) Frequencies- If you feel that …… etc..... 63

Fig. (4. 16) Frequencies- If the management …… etc 64
Fig. (4. 17) Frequencies- If you tell the managers …… etc 65
Fig. (4. 18) Frequencies- Motivation affects your …….. etc..... 66
Fig. (4. 19) Frequencies - You consider yourself as ……. etc 67
Fig. (4. 20) Frequencies - The objective which……..etc..... 68
Fig. (4. 21) Frequencies - The company motivates …….. etc..... 69
Fig. (4. 22) Frequencies - Motivation helps in …… etc..... 70
Fig. (4. 23) Frequencies Training improves ……. etc. 71
Fig. (4. 24) Frequencies Training enhances …… etc. 72
Fig. (4. 25) Frequencies- Supervisors give the …….. etc..... 73
Fig. (4. 26) Frequencies- Training increases …… etc..... 74
Fig. (4. 27) Frequencies- Training helps employees……. etc..... 75
Fig. (4. 28) Frequencies- Training decreases …… etc 76
Fig. (4. 29) Frequencies- Training decreases the …… etc 77
Fig. (4. 30) Frequencies-Training reduces accidents of ... etc 78

List of Tables

Table (4. 1) shows what are the types of sectors for the sample 49
Table (4. 2) shows what are the businesses for the sample.....50
Table (4. 3) How long have the sample dealing with construction projects 51
Table (4. 4) shows the size of the projects that the sample are working at 52
Table (4. 5) shows the level of education for the sample 53
Table (4. 6) shows the views of the sample in: recruitment and selection of qualified labors appear directly in the completion of the project on time.....54
Table (4. 7) shows the views of the sample in: Recruitment and selection of qualified labors reduce mistakes.....55
Table (4. 8) shows the views of the sample in : Recruitment and selection of qualified labors benefits the current labors of the company.....56
Table (4. 9) shows the views of the sample in: Recruitment and selection of qualified labors reduce the cost of reworking .57
Table (4. 10) shows the views of the sample in: Recruitment and selection of qualified labors reduce the waste of material 58
Table (4. 11) shows the views of the sample in: Recruitment and selection of qualified labors appear in the termination of the project with the expected cost.....59
Table (4. 12) shows the views of the sample in: The recruitment and selection of labors according to their experience.....60
Table (4. 13) shows the views of the sample in: The work of recruited and selected labors according to the specifications.....61

Table (4. 14) shows the views of the sample in: There is no reworking for the recruited and selected labors.....62
Table (4. 15) shows the views of the sample in: If you feel that physical motivation (wage or otherwise) is insignificant or unfair the quality of the work will be declined 63
Table (4. 16) shows the views of the sample in: If the management treats you poorly or not giving you enough respect, the level of your quality will be declined.....64
Table (4. 17) shows the views of the sample in: If you tell the managers about your suggestions or ideas for the development of the work or for solving problems at the company for example quality problems will be put in their consideration 65
Table (4. 18) shows the views of the sample in: Motivation affects your performance, pushing you to accomplish your tasks on time 66
Table (4. 19) shows the views of the sample in: You consider yourself as a good labor, fulfilling your job properly in your company 67
Table (4. 20) shows the views of the sample in: The objective which the company's senior management aspires to reach is clear and understandable for you.....68
Table (4. 21) shows the views of the sample in: The Company motivates the labors whom have not done mistakes 69
Table (4. 22) shows the views of the sample in: Motivation helps in accomplishing the project with the expected cost.....70
Table (4. 23) shows the views of the sample in: Training improves the quality of the work.....71

Table (4. 24) shows the views of the sample in: Training enhances organization effectiveness and reputation.....72
Table (4. 25) shows the views of the sample in : Supervisors give the labors chances to tryout training on their current jobs 73
Table (4. 26) shows the views of the sample in : Training increases the awareness of the importance of time in the project 74
Table (4. 27) shows the views of the sample in : Training helps employees doing their tasks on time 75
Table (4. 28) shows the views of the sample in: Training decreases the possibility of the project deviation from time 76
Table (4. 29) shows the views of the sample in: Training decreases the expenditures in the project.....77
Table (4. 30) shows the views of the sample in: Training reduces accidents of work, which affects positively the cost of the project 78

CHAPTER ONE

INTRODUCTION

1-1 Introduction:

Managing labors at work began at the time of the industrial revolution in the late eighteenth century. Before this era few of large organizations existed, but, with the invention of new technology, factory systems developed and large numbers of people moved into the towns and cities to work. The work environment was very unfavorable at this time and employees, including young children, worked very long hours for very little reward in difficult and often dangerous working conditions. The approach to manage labors was harsh and the main aim was to control the workers who had few, if any, rights. Some of Charles Dickens' novels, such as Hard Times, depict the lives of the working class of this era. The first efforts to show concern for workers came toward the end of the nineteenth century when some large organizations decided to improve the situation of their employees.

1-2 Problem of the research:

The majority of the construction companies ignore the role of human resources management on attaining the goals of the projects which appears in, for example exceeding the cost of projects, many projects have been executed with low quality and some consumed more time than their plans.

1.3 Objectives of the research:

To show the role of human resource management (recruitment, training and motivation) on attaining the goals of Sudanese construction project (time, quality and cost)

1.4Questions of the research:

1- Does recruitment of human resource affect time , quality and cost of a construction project?
2- Does training of human resource affect time , quality and cost of a construction project?
3- Does motivation of human resource affect time , quality and cost of a construction project?

1.5 The importance of the research:

This research highlights that the well managing people in the construction projects appear obviously in achieving goals of the project within time , quality and cost required .

1.6 Research methodology:

This research followed the methodology and descriptive analytical .

The researcher in this study adopted systematic processes:

- Theoretical aspect: the researcher has read a set of references (books, articles and researches) in the area of research and has put an informative study.
- Scientific aspect was formulated by collecting data from companies of (construction, consultant) through a questionnaire as a tool . Hence the data have been discussed

and interpreted , then general recommendations have been obtained.

1.7Scope of the research:

- This research has been done in Khartoum.
- The research addresses resource management especially human resource management in construction project in terms of recruitment, training and motivation and their role to the goals of the project.

1.8 Research Structure:

This research comprises main five chapters as followings:

Chapter one: Introduction: This chapter shows the main problems, objectives, questions, the importance, the methodology and the scope of the research.

Chapter two: Literature review: This chapter shows a historical review from previous study by identifying terminologies and some aspects in the area of Human Resource Management and Construction Industry.

Chapter three: This chapter shows the research methodology

Chapter Four: Results analysis: This chapter shows analysis , description and discussion of research results .

Chapter Five: Conclusions and recommendations.

CHAPTER TWO

CONSTRUCTION INDUSTRY

Construction can be considered as vital sector contributing to the economics of all countries . the construction industry must be dynamic to be able to respond to the changes that the world is constantly facing , as well as the social, economic ,and technological challenges affecting all industries .

The opportunities and problems in demands of clients, companies and employees differ from time to time, and thus the vision of the construction industry is always developing: to keep up to date, management must change too, which will be helpful in shaping the goals and requirement of the future.

Construction project development involves numerous parties , various processes , different phases and stages of work and great deal of input from both the public and private sectors , with the major aim being to bring the project to a successful conclusion .

The level of success in carrying out construction project development activities will depend heavily on the quality of the managerial, financial , technical and organizational performance of the respect parties , while taking into consideration the associated risk management , the business environment , and economic and political stability. Any construction organization must have a strategic plan and vision that lead the way to achieving its goals.

The key to achieving that lays in successful management, by identifying needs and goals the company wants to achieve.

To do that that, project management must be planned on many levels, such as implementing, organizing, delegating, decision making and performing. The survival and progress of any company depend upon how well project management is implemented and how experienced the company is in this field (Walker, 2008).

2-1 Definition of construction industry:

In field of architecture and civil engineering construction industry defines as a process that consists of building or assembling of infrastructure (The American Heritage Dictionary, 2004)

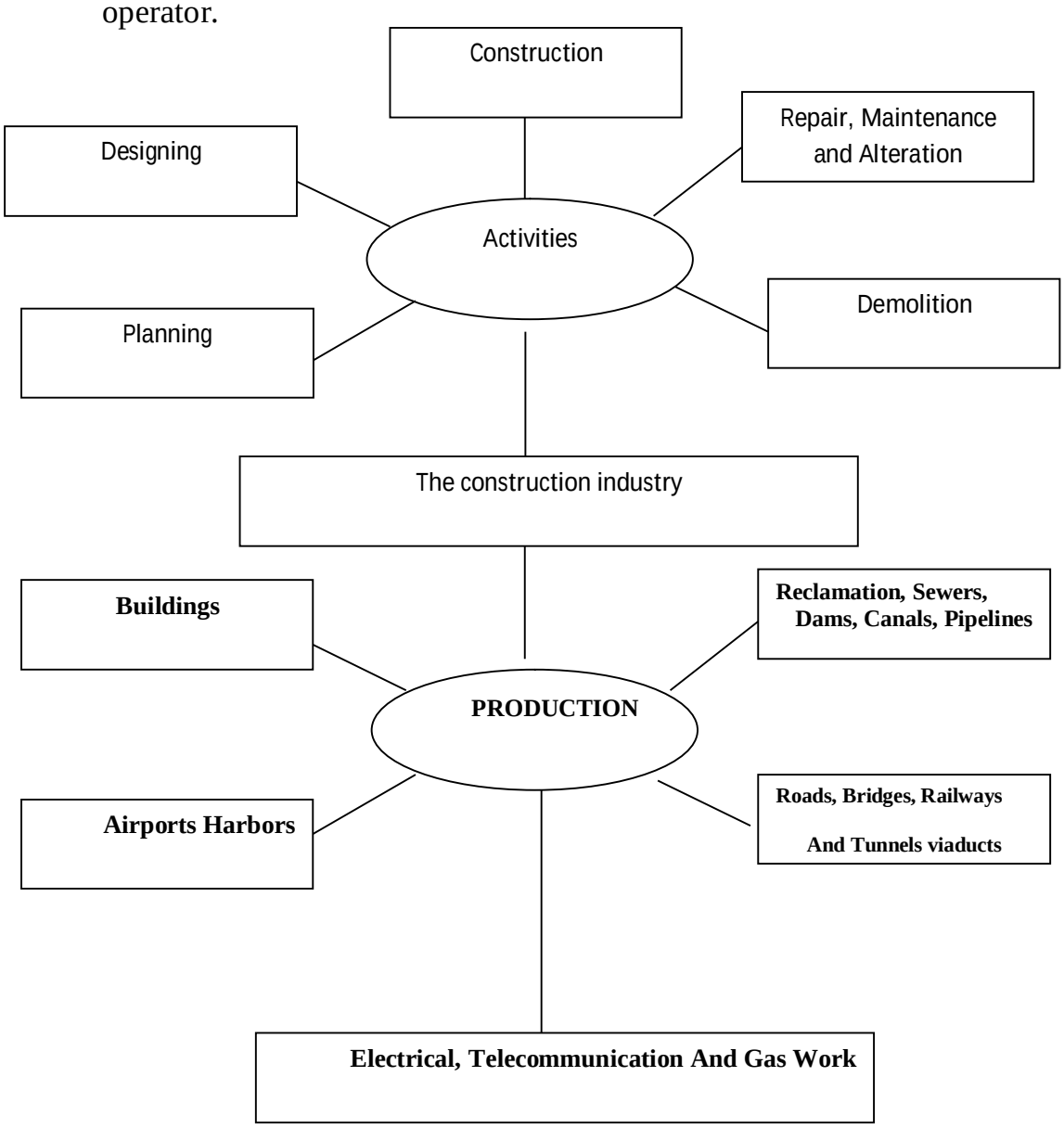
The construction industry is a sector of the economy that transforms various resources into constructed physical economic

and social infrastructure necessary for socio-economic development. It embraces the process by which the said physical infrastructure are planned, designed, procured, constructed or produced, altered, repaired, maintained, and demolished. The constructed infrastructure includes:

- Buildings
- Transportation systems and facilities which are airports, harbors, highways, subways, bridges, railroads, transit systems, pipelines and transmission and power lines.
- Structures for fluid containment, control and distribution such as water treatment and distribution, sewage collection and treatment distribution systems, sedimentation lagoons, dams, and irrigation and canal systems.
- Underground structures, such as tunnels and mines.

The industry comprises of organizations and persons who include companies, firms and individuals working as consultants, main

contractors and sub-contractors, material and component producers, plant and equipment suppliers, builders and merchants. The industry has a close relationship with clients and financiers. The government is involved in the industry as purchaser (client), financier, regulator and operator.



The construction industry is often defined in terms of the activities and products that are included in, or excluded from it

Fig. (2. 1) The Construction Ind ustry (Offori G., 1990, p.20)

2-2 The importance of the construction industry:

Construction industry is an important industry due to the variety of demand for the essentials project in the life of any nation, which the industry must satisfy:

- The demand for housing construction
- The demand for building construction such as commercial social uses etc
- The demand for heavy engineering construction
- The demand for industrial construction including factories etc
- The construction industry has single characteristics, which are shared by other industries, but in combination they appear in construction alone, making it worthy of different treatment .
- These characteristics fall into four main groups , which are:
- The physical nature of the product
- The structure of the industry together with the organization of the construction process.
- The method of price determination (Turin, 1973).

2-3 The nature of the construction industry:

Construction process is the whole series activities between the initiating point of a client needs and production of a building to fulfill these needs. There are certain characteristics that distinguish a project from a production process.

The most important of these are:

That it is a non-repetitive on in operation of building .

Although the organization may be repeating the same job, every project is a unique exercise , that it has a clearly identifiable beginning and end that significant changes in its environment and internal operating conditions take place through its duration . (Tavitsock Report, 1963).

The nature of construction process is labor- intensive.

Construction, as an important factor in development, is comparatively less dependent on fixed capital even in developed countries. (Strassmann , 1970)

Quoting Mrthur Lewis**:** "Roads, vaiduct and irrigation canals can be created by human labor with hardly any capital to speak of following Ragnen Nurkse and writers of general development book, (Strassmann, 1970) argue that under employed or surplus labor could be used with title capital in buildings community development projects or self-help dwelling.

As has often been noted, construction tended to be labor-intensive actually even in industrialized countries (Strassmann , 1970)

2-4 Challenges in construction:

Construction industry is one of the most complex and problematic sectors within which to manage people:

- The operational realities faced by construction organizations, means there is a risk that the needs of employees are subjugated by performance concerns.
- There can be insufficient time for strategic planning because of the tendency for construction to be awarded at short notice following a competitive tendering bid.

- Several organizations may work together on a project , perhaps forming a joint venture or some other form of special purpose vehicle .
- There tends to be a transient workforce that may be made up of different contractors and subcontractors.
- There is an increasing tendency for construction industry organizations to appoint sub consultants and subcontractors with skills suitable for partial projects, rather than making internal permanent appointments. This gives greater flexibility but can make training and long term planning more difficult.
- The workforce may work long hours, Claim high travel expenses, have different nationalities and working culture and so on.
- Staff turnover tends to be quite high on construction projects.
- Personnel change as projects progress and different skills and experience are required.

2-5 Sudanese Construction Industry:

In the eastern Afric , Sudan is a country with the largest land area on the Africa continent comprising 2.5 million square kilo meters , and the ninth largest in the world in terms of area , it shared extensive boarders with nine countries . it also a land of greatest diversity: Ethnically, geographically and ecologically, and its faces the challenge of utilizing /capitalizing on such diversity to achieve development and eradicate poverty. because of its vast area , the country embraces many climatic and ecological zones. Diversity is also reflected in its people; and as a result, the country is multi-cultural, multi ethics, multi lingual and multi regions. (Wiki)

2-5-1 Construction industry in Sudan:

The construction industry, particularly the building industry in Sudan is construction as the largest industrial sector that has a direct effect on the national economy. Construction is only sector of economic, which appears twice in the national accounts presented according to unite nation recommendation. Thus construction is one of eleven sectors of the analysis of Gross Domestic Product (GDP) at the factor that cost by industrial origin; but the construction is also a component of fixed capital formation in the composition of gross domestic capital formation by types of assets. The construction appears a separate entry in labor statistics reported by the international labor organization (Awad Saad, 2002).

Mohamad Elmuntasir Ahmed, professor at the Faculty of Engineering and Architecture at Khartoum University, said "the construction industry in Sudan is changing use . they are cutting the green areas in Khartoum and creating residential areas . it is not every well planned , and is already having a negative impact on the quality of water and soil .the long term danger is that it will lead to water scarcity and other socio-economic and health impacts ".

In the absence of guideline to regulate which building products can be imported , certain contractors are using hazardous materials , he adds "these materials will introduce chemicals that can harm the environment and the health of residents. We find that flame retardants used in construction are sources of toxins that can be transferred through the mother's breast milk to infants it can also cause cancer. The atmospheric environment is also affected by these chemical"

2-6 Project success and project performance:

Project success is the completion of a project within acceptable time, cost and quality and achieving client's satisfaction. Project success can be achieved through the good performance of indicators of the project.

So, success refers to project success and performance refers to performance of indicators such as project managers. The success of any project is related to two important features, which are service quality in construction delivered by contractors and the project owner's expectations. Managing the construction so that all participants perceive equity of benefits can be crucial to project success . it is obtained that the complete lack of attention devoted to owner's satisfaction contributes to poor performance , also low efficiency and productivity can lead to poor performance. The success of construction projects depends up on technology, process, people, procurement, legal issues, and knowledge management which must be considered equally. The focus of most studies of project success is on dimension of project success (how to measure it) and factors influencing project success. (Pheng and Chuan, 2006).

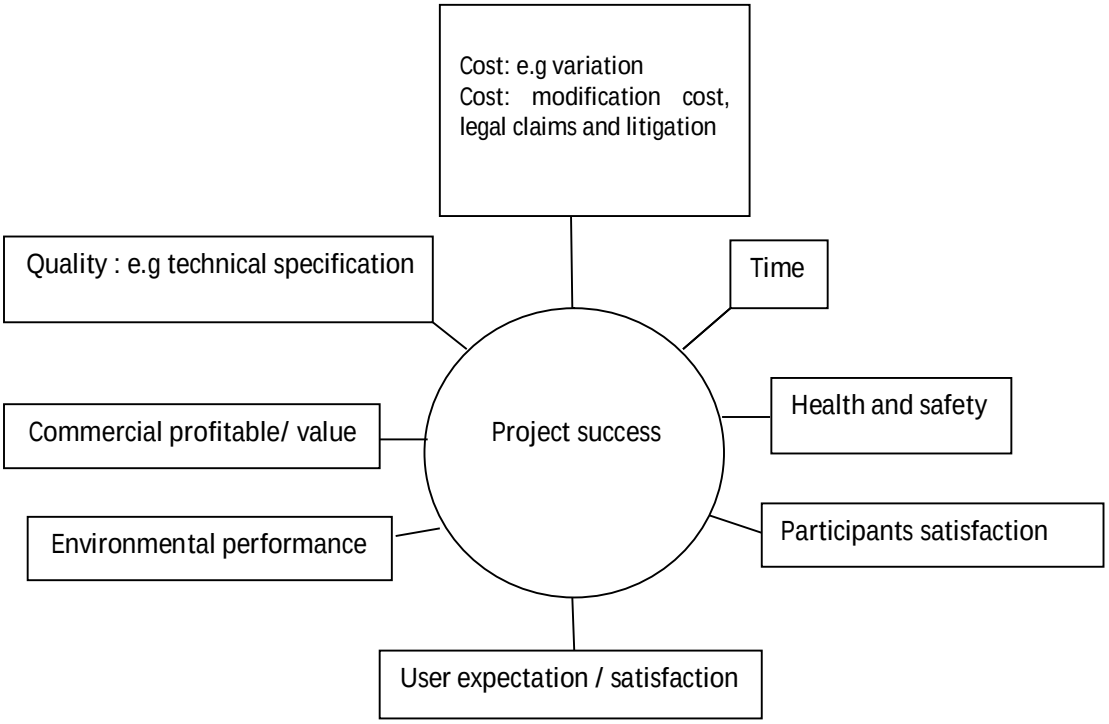


Fig. (2. 2) Project success (pheng and chuan,2006)

2-7 The construction industry elements:

The construction industry uses six main elements to create a new building .

The six elements are:

- Materials.
- Machinery.
- Manpower.
- Engineering technology.
- Funds.
- Management.

When a building is constructed two main physical resource are involved these are material necessary to form the various parts, and human resources that technical knowledge to join the parts into one enclosure.

Initially the material employed were those, which could most easily be obtained from the accessible areas of the surface of the earth.

Work force element is most important factor and most be characterized by capability, honesty, loyalty and commitment. A success or failure depends mainly on how wisely these elements are managed.

2-8 The project in construction industry:

The project in construction industry is defined as a combination of interrelated activities that must be executed in a certain order before the internal task can be completed. the activities are interrelated in a logical sequence in a sense that some activities can not start until others are completed . An activity in a project is usually viewed as a job requiring time and resources for its completion. in general a project is one time effort , and that is , the same sequence of activity may not be repeated in the future (Hamdy A.Taha -1992).

- **A project generally follows these steps:**

Step 1: Project Definition (to meet the needs of the end user)

Intended use by the owner upon completion of construction

Conceptual configurations and components to meet the intended use

Step 2: Project Scope (to meet the project definition)

Define the work that must be accomplished

Identify the quantity, quality, and tasks that must be performed

Step 3: Project budgeting (to match the project definition and scope)

Define the owner's permissible budget

Determine direct and indirect costs plus contingencies

Step 4: **Project planning** (the strategy to accomplish the work)

Select and assign project staffing.

Identify the tasks required to accomplish the work.

Step 5: Project scheduling (the product of scope, budgeting, and planning)

Arrange and schedule activities in a logical sequence.

Link the costs and resources to the scheduled activities.

Step 6: Project tracking (to ensure the project is progressing as planned).

Measure work, time, and costs that are expended.

Compare "actual" to "planned work, time, and cost.

Step 7: Project Close Out (final completion to ensure owner satisfaction).

Perform final testing and inspection, archive documents, and confirm payments, turn over the project to the owner (Garold D. Oberlender **, 2000).**

2-9 Project Teams:

Project teams must be assembled to accomplish the work necessary to complete engineering and construction projects. Team members are vital to the success of the project. The project manager depends on the team because he or she typically does not have the expertise to do all the work required to complete the project. For any team, there must be a leader to guide the overall efforts. In many respects the project manager acts as a coach, answering questions, making sure the team understands the desired outcome of the project, and ensuring

that team members know what is expected of them and the importance of sharing information. The project manager must make sure that his or her team understands and is focused on the desired outcome of the project. The project manager also acts as a facilitator in project communications for conflict resolution and team performance.

Project teams are made up of all the participants in the project, including in-house personnel and outside consultants. Team members report either part-time or full-time to the project manager and are responsible for some aspect of the projects.

activities. Teamwork must be well coordinated with effective interaction to achieve the shared objective of completing the scope, budget, and schedule constraints of the project. Managing project teams is a fundamental skill within the area of human resources management. The Project Management Institute defines human resources management as the art and science of directing and coordinating human resources throughout the life of a project, by using administrative and behavioral knowledge to achieve predetermined project objectives of scope, cost, time, quality, and participant satisfaction.

2-10 Project Management for Engineering and Construction:

For a successful project, the project manager must build and lead an effective project team. Team building is the process of influencing a group of diverse individuals, each with his or her own goals, needs, and perspectives, to work together effectively for the good of the project. The team effort should accomplish more than the sum of the individual efforts. Every team needs motivation. Team motivation is the process by which project managers influence the team members to do what it takes to get the job done. The key problem is "How do you

motivate team members when they are borrowed resources?" Usually, members of the project team are individuals who are assigned from other departments to the project manager's project.

Because these individuals are borrowed from other departments or hired from outside organizations, the project manager must devise a method to motivate them to be dedicated to the project while remaining loyal to their home departments and organizations.

This presents a real challenge to the project manager.

2-11 Management of construction projects:

Construction projects can be considered as a largest industry in the world. Growth in this industry in fact is an indicator of the economic condition of a country. This is because the construction industry consumes a wide employment circle of labor. It is on the other hand , most of construction project exhibit cost overruns , time extensions , and conflicts among parties and dereliction in safety and quality sector .

Project management is designed to control the main important elements that provide practical information for achieving project . (Kerzner , 2006) defined PM as "project management is the planning , organizing , directing and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives. Furthermore, project management utilizes the system approach to management by having functional personnel (the vertical hierarchy assigned to a specific project (the horizontal hierarchy).

Figure shows that project management is designed to control the key elements that provide practical information for achieving objective in an

efficient way; it means using the company resources on a certain activity within time, cost and performance constraints. A fourth key is good customer relations.

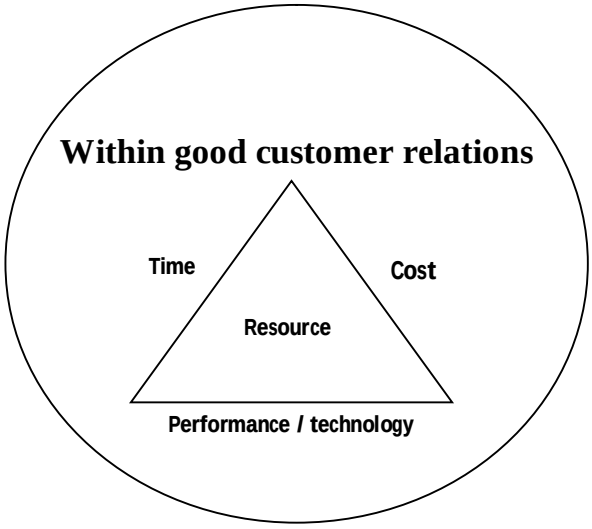


Fig. (2. 3) Project success (Kerzner, 2006)

This figure shows that project management is designed to control the key elements that provide practical information for achieving project objectives.

(Kerzner, 2006) highlighted the main keys in project management is time and cost with an accepted level of performance.

There are many definitions for project management, but the project management body of knowledge defined PM as "the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder's needs and expectations from a project"

Construction project management has the same objects as project management which are cost , time and performance , but in construction PM its cost , time and quality ,which did not change fundamentally but may took a wider range in referring to people and importance of working through others, also in construction project management client

satisfaction is one important key to project success as well as the objective and goals of the company itself (Walker -2007)

2-12 Time:

The time factor manifests itself in a project in the form of deadlines for tasks and the amount of time that these tasks may take. Managing time involves ensuring that tasks are completed on time.

Time in project plans:

- Determine which activities should take place in which phase.
- Estimate how long each activity will take
- Determine the order in which activities should be completed.
- Allocate people and materials.
- Allocate activities over time.
- Determine the (most important) deadlines.

Time in progress monitoring:

- Monitor progress.
- Monitor deadlines.
- Adjust schedules.

Time in project reporting:

- Report on the actual timeline.
- Analyse and explain why some tasks proceeded much more quickly or much more slowly than expected.

Time schedules are based on a work-breakdown structure (WBS). A WBS is a decomposition of the tasks that must be completed in order to achieve the project result. Developing a time schedule requires knowing

the amount of time that is needed for each task, who will complete each task and when.

2-13 Quality:

The project result must fulfill a number of quality requirements. This also applies to the various intermediate products of the project. When managing a project, it is particularly important for quality requirements to be determined, agreed upon and recorded in writing during the definition phase. These requirements should never remain implicit. A clear list of requirements can be checked at the end of the implementation phase. This can allow the project team to prove that they have carried out the project according to specifications. Additional quality requirements may be specified for various tasks within the project. For example, a particular task can be carried out only by certified personnel.

2-14 Money:

The money factor manifests itself in the project budget. The management of money within a project involves ensuring that the costs remain within the budget. Given that the majority of the costs in most projects are comprised of labour costs, the factors of money and time (the number of labour hours) are closely intertwined.

- Money in project plans:
- Determine the fees of the team members.
- Estimate the hours for the team members.
- Assign budgets to team members for specific tasks.
- Determine costs for material and tools. (Wouter Baars, 2006)

2-15 Factors affecting cost and time performance:

One of the most important in the construction industry is time and cost overruns. time and cost overruns may occur in every construction project and the magnitude of these delays and cost overruns varies considerably from project to project .so it is essential to define the actual causes of time and cost overruns in order to minimize and avoid the delays and increasing cost in any construction project .

Time overruns is defined as the extension of time beyond planned completion dates traceable to the contractors. Delays are incidents that impact a project's progress and postpone project activities; delay causing incidents may include weather delays, unavailability of resources , design delays, …etc. In general project delays occur as a result of project activities that have both internal and external factors surrounded the project . cost overrun is also defined as excess of actual cost over budget .cost overrun is also sometimes called "cost escalation ""cost increase "or budget overrun. There is difference between the original cost estimate of project and actual construction cost completion of works of a commercial sector construction project.

A number of unexpected problems and changes from the original design arise during the construction phase , leading to problems in cost and time performance . it is found that poor site management, unforeseen ground conditions and low speed of decision making involving all project teams are most significant factors causing delays and problems of time performance .it is remarked that effective communication, fast information transfer between project participants, the better selection and training of managers, and detailed construction program with advanced available software can help to accelerate the performance .(Chan ,2002)

2-16 Factors affecting quality performance:

This process is needed in this stage to make sure that what is produced by the team is exactly what had been agreed upon with the client or customer. Quality management is needed not only in this phase but throughout the project. At this point it is important to ensure that expectation of our work is what was planned from the beginning. The factors that affect process quality in the three phases (design, construction and operation) of the life cycle of a building project are identified and ranked by degree of importance. the preparation of long-time practitioners are obtained by means of questionnaire survey The findings indicate that management commitment to continuous quality improvement, management leadership in promoting high process quality ;quality training of all personnel , efficient teamwork to promote quality issues at the corporate level , and effective cooperation between parties taking part in the project are generic factors that affect process quality.

Industry-specific factors that are perceived by practitioners to enhance the quality of the building process include drawings and specifications that are consistent , designers and contractors that are selected on merit , communication practices between the parties that are effective , inspection of quality on the construction site that is diligent a building operation manual that is thorough, and an adequate operation and maintenance budget that is planned as early as in the design phase (Arditi, D and Gunaydin , H ,1998).

2-17 Human resources management:

Human Resource Management (HRM) is a relatively new approach to managing people in any organization. People are considered the key resource in this approach. It is concerned with the people dimension in management of an organization. Since an organization is a body of people, their acquisition, development of skills, motivation for higher levels of attainments, as well as ensuring maintenance of their level of commitment are all significant activities. These activities fall in the domain of HRM. Human Resource Management is responsible for maintaining good human relations in the organization. It is also concerned with development of individuals and achieving integration of goals of the organization and those of the individuals.

2-18-1 Definition of human resources management:

Human resource management (HRM) is the policies, practices, and systems that influence employees' behavior, attitudes, and performance. Many companies refer to HRM as involving "people practices". There are several important HRM practices that should support the organization's business strategy: analyzing work and designing jobs, determining how many employees with specific knowledge and skills are needed (human resource planning), attracting potential employees (recruiting), choosing employees (selection), teaching employees how to perform their jobs and preparing them for the future (training and development), evaluating their performance (performance management), rewarding employees (compensation), and creating a positive work environment (employee relations). An organization performs best when all of these practices are managed well. At companies with effective HRM, employees and customers tend to be

more satisfied, and the companies tend to be more innovative, have greater productivity, and develop a more favorable reputation in the community (Raymond A. Noe, 2011).

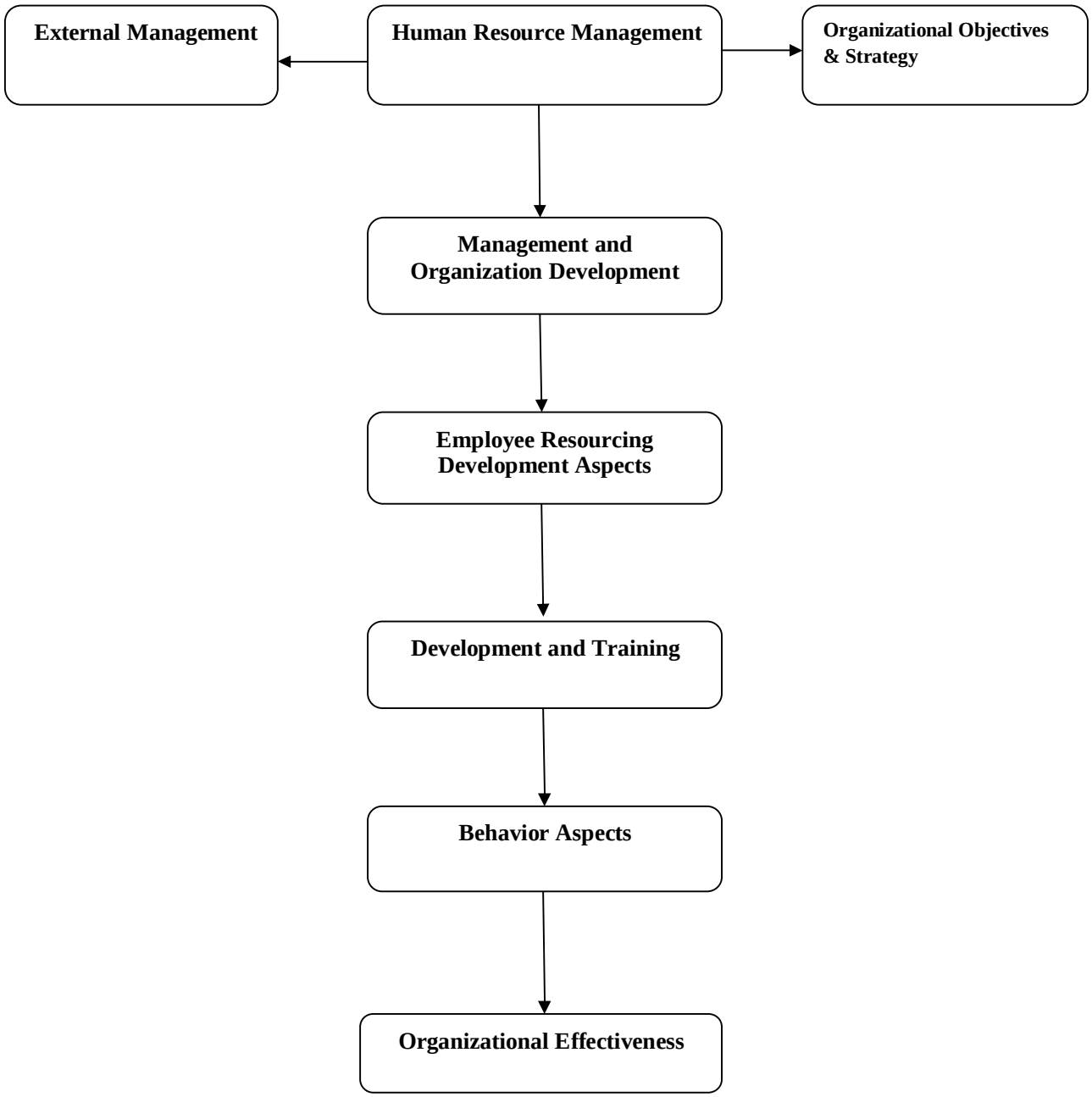


Fig. (2. 4) Model of human resource management (Naoum, 2001)

2-18-2 Scope of HRM:

As HRM has tools of a system which attracts, develops, motivates, and retains the effective functioning related with the people managing, the scope of HRM is very wide. Researches in behavioral sciences show that new trends in managing workers and advances in the field of training have expanded the scope of HR function in recent years . The India Institute of Personnel Management has specified the scope of HRM thus (Truss, 2001):

- Personnel aspect: This is concerned with manpower planning, recruitment, selection, placement, transfer, promotion, training and development, lay off and retrenchment, remuneration, incentives, productivity, etc.
- Welfare aspect: It deals with working conditions and amenities such as canteens, creches, rest and lunch rooms, housing, transport, medical assistance, education, health and safety, recreation facilities, etc.
- Industrial relations aspect: This covers union-management relations, joint consultation, collective bargaining, grievance and disciplinary procedures, settlement of disputes, etc.

2-18-3 Barutçugil (2004), HRM aims (as quoted in Aray, 2008):

- To help all employees reach optimal performance and to use fully their capacity and potential.
- To convince employees to exert more effort for reaching organizational goals.
- To use human resources in an optimum way to reach organizational goals.

- To meet employees' career expectations and development,
- To unify organizational plans and HR strategies and create and maintain a corporate culture.
- To offer a working environment stimulating hidden creativity and energy.
- To create work conditions stimulating innovation, teamwork, and total quality concept.
- To encourage flexibility for achieving learning organization. .

2-18-4 The importance of human resources management:

Human Resource Management has a place of great importance. According to **Peter F. Drucker, —**The proper or improper use of the different factors of production depend on the wishes of the human resources. Hence, besides other resources human resources need more development. Human resources can increase cooperation but it needs proper and efficient management to guide it. Importance of personnel management is in reality the importance of labour functions of personnel department which are indispensable to the management activity itself. Because of the following reasons human resource management holds a place of importance.

- It helps management in the preparation adoption and continuing evolution of personnel programmes and policies.
- It supplies skilled workers through scientific selection process..
- It ensures maximum benefit out of the expenditure on training and development and appreciates the human assets.
- It prepares workers according to the changing needs of industry and environment.

- It motivates workers and upgrades them so as to enable them to accomplish the organization goals.
- Through innovation and experimentation in the fields of personnel, it helps in reducing casts and helps in increasing productivity..
- It contributes a lot in restoring the industrial harmony and healthy employer-employee relations.
- It establishes mechanism for the administration of personnel services that are delegated to the personnel department. Thus, the role of human resource management is very important in an organization and it should not be undermined especially in large scale enterprises. It is the key to the whole organization and related to all other activities of the management i.e., marketing, production, finance etc.

Human Resource Management is concerned with the managing people as an organizational resources rather than as factors of production. It involves a system to be followed in business firm to recruit, select, hire, train and develop human assets. It is concerned with the people dimension of an organization. The attainment of organizational objectives depends, to a great extent, on the way in which people are recruited, developed and utilized by the management. Therefore, proper co-ordination of human efforts and effective utilization of human and others material resources is necessary

2-18-5 Factors affecting on HRM :

Traditionally, the personnel function centered on control and direction of employees for achievement of predetermined goals. The Human Resources Approach, in direct contrast to this, recognizes the worth of human being in the realization of corporate goals. It takes a supportive and developmental route to achieve results through the cooperative efforts of employees. When opportunities for growth and enhancement of skills are available, people will be stimulated to give their best, leading to greater job satisfaction and organizational effectiveness. The manager's role, too, has undergone a dramatic change over the years. From control and direction of employees, he is expected to move toward clarifying goals and paths and creating a supportive and growth oriented environment, where people are willing to take up assigned roles willingly and enthusiastically (Kumar, 2009). The effective use of people is the most critical factor in the successful accomplishment of corporate goals. To be effective, therefore, Human Resource managers need to understand the needs, aspirations, and concerns of employees proactively, face the challenges head-on and resolve issues amicably. They are expected to successfully evolve an appropriate corporate culture, take a strategic approach to the acquisition, motivation and development of human resources and introduce programs

that reflect and support the core values of the organization and its people

2-18-6 Training:

Much of the workforce remains unskilled or under-skilled, therefore training must be considered as an option when staffing for a project" (Srour et al. 2006).

2-18-6-1 Definition of training:

An intended effort with proper plan to smooth the progress of employee's learning of competencies that are related to his/her job. (Noe Raymond, 2010).

2-19 Motivation:

People are individuals with different personalities and each one of us has our own goals that we want to achieve in life. Not everyone wants to learn new skills or complete training programmes. However, we can all become motivated to complete a job to a high standard. Individuality means that what might motivate one person may not necessarily motivate another.

Motivation is an art targeted to getting people work willingly, and an art of inducing one to behave in a particular manner to achieve a task. Mee-Edoiye and Andawei (2002) viewed motivation as a human engineering approach being triggered by the Individual needs. Flippo (1982) defined motivation as a psychological process initiated by the emergence of needs involving a goal directed action and behaviour

Aimed at satisfying a particular desire. It is the inducement given to workers for higher output. Motivated behavior has three basic characteristics:

- It is sustained – it is maintained for a long time until satisfied.
- It is goal-directed – it seeks to achieve an objective.
- It results from a felt need – an urge directed towards a need.

2-19-1 Theories of motivation:

2-19-1-1 Maslow's Theory

The hierarchy of needs theory was pioneered by Abraham H. Maslow in 1954. According to this theory, in order to motivate a person there is a need to understand what level of condition the person has in the hierarchy of needs and to focus the attention on the satisfaction of the needs on that level or on the level above of it [Robbins, (2001)]. This theory stated that in each individual, there are five hierarchies of needs: physiological needs, safety needs, social needs, the need for esteem, and self-actualization. The five categories of needs in general can be grouped into two major categories: lower-order needs, covering physiological and safety needs; and higher-order needs, encompassing social, esteem, and self-actualization needs. This study utilized the theory to explain the needs of construction workers.

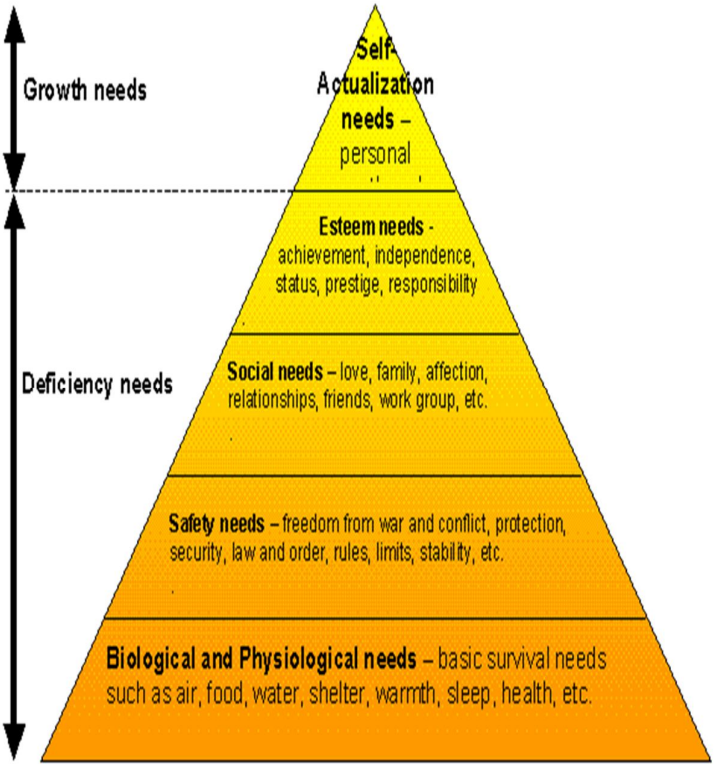


Fig. (2. 5)): shows Maslow's Hierarchy of Needs success : A theory of Human needs (1943)

2-19-1-2 Herzberg's Theory:

This theory, sometimes known as Two-Factors Theory or Motivation-Hygiene Theory, was stated by Frederick Herzberg and his colleagues in the Psychological Service of Pittsburgh. The basic idea of this theory is that one's relationship toward his work is absolutely fundamental and that one's behavior toward his work undoubtedly determines the work's success. Herzberg's study showed that people have two distinct categories of need, i.e. hygiene factor and motivator factor, in which the two are independent and influence behavior in different ways.

The first factor, called hygiene, defines the environment where people work and has the main objective to avoid job dissatisfaction. It is also defined as maintenance because the factors are never fully satisfied, and require maintenance. Manager needs to pay attention to this factor so that the workers keep working at their normal condition. Examples of hygiene factor are policies and administration, supervision, and working conditions [Hersey et al., (1996)]. On the other hand, Herzberg called the second factor as the motivator since it seems to be very effective in motivating a person to a better action. The factor is more related to the job itself and can include achievement, recognition for accomplishment and challenging work [Hersey et al., (1996)]. Herzberg had an idea that if a factor is a motivator, it surely leads to job satisfaction

2-20 Employee motivation:

Workers in any organization need something to keep them working . Most time the salary of the employee is enough to keep them working for an organization . However , sometimes just working for salary in not enough for employees to stay at an organization . An employee must be motivated to work for a company or organization . If there is not motivation an employee's quality of work or all work in general will deteriorate .

2-21 Types of Motivation:

Motivation at work can take place in two ways:

- Firstly, people can motivate themselves by seeking, finding and carrying out work (or being given work) that satisfies their needs or at least leads them to expect that their goals will be achieved.

Secondly, people can be motivated by management through such methods as pay, promotion, praise, etc

There are two types of motivation as originally identified by Herzberg *et al* (1957):

● *Intrinsic motivation* – the self-generated factors that influence people to behave in a particular way or to move in a particular direction. These factors include responsibility (feeling that the work is important and having control over one's own resources), autonomy (freedom to act), scope to use and develop skills and abilities, interesting and challenging work and opportunities for advancement.

● *Extrinsic motivation* – what is done to or for people to motivate them. This includes rewards, such as increased pay, praise, or promotion, and punishments, such as disciplinary action, withholding pay, or criticism.

Extrinsic motivators can have an immediate and powerful effect, but it will not necessarily last long. The intrinsic motivators, which are concerned with the 'quality of working life' (a phrase and movement that emerged from this concept), are likely to have a deeper and longer-term effect because they are inherent in individuals and not imposed from outside.

2-22 Recruitment:

Recruitment is a set of activities designed to attract a qualified pool of job applicants to an organization. Effecting recruiting brings employment opportunities to the attention of persons with abilities and skills appropriate to job specification. BARBER (1998,P.78)

2-22-1 Purpose and importance of recruitment:

- Determine the present and future requirements in conjunction with personnel planning and job analysis activities
- Increase the pool of job candidates at minimum cost
- Help increase success rate of selection process by reducing number of under-qualified or over-qualified applications.
- Reduce the probability that job applicants once selected would leave shortly
- Meet legal and social obligations
- Identify and prepare potential job applicants
- Evaluate effectiveness of various recruitment techniques and sources for job applicants.

2-23 Human Resource Management in construction projects:

Human resources management (HRM) is the part of management that deals with administration and welfare of the human resources. It can be regarded as the agent for implementing organizational strategies that are set by its leader. Hence, the personal function becomes as an important part of practicing in construction organization as the marketing finance functions (Awad Saad, 2005).

2-23-1 A short history of labor relations in construction:

Labor relations in construction do not have a glorious past. The industrial revolution heralded a new age of technology and rapid change. Until then skilled craftsmen would typically be employed in a localized area to complete work as required by a client such as a local landowner or the church. The evolution of the guild system became an effective way for the craftsmen engaged in building which required their skills to protect their pay and conditions (Reid, 2005). However, demand for faster ways to manufacture and transport goods that the new factories were producing necessitated workers in construction to adapt to ways of working and pressures that were driven by commercial pressures imposed by the contracting system by which work was divided up and let out to smaller subcontractors who employed “overseers” (‘gangers) and the workers (Ball, 1998). The incredible speed at which the canal and railway infrastructure was built meant that contractors most able to respond were in most demand and were able to pay highest rates of pay (Wolmar, 2007). Construction which had always been a somewhat dangerous profession became one in which death and injury became commonplace:

"…profit came before concerns about workers' conditions or safety. Intense competition between rival railway companies to open lines early put pressure on contractors to complete faster. Subcontractors responded by demanding that gangers force their men to work faster and take risks. Injuries were common and those most seriously disabled frequently faced a life of destitution ". (McCabe, 2007).

2-23-2 Construction industry in Sudan:

The construction industry, particular the building industry in Sudan is construction as the largest industrial sector that has a direct effect on the national economy. Construction is only sector of economic, which appears twice in the national accounts presented according to unite nation recommendation. thus construction is one of eleven sectors of the analysis of Gross Domestic Product (GDP) at the factor that cost by industrial origin; but the construction is also a component of fixed capital formation in the composition of gross domestic capital formation by types of assets . the construction appears a separate entry in labor statistics reported by the international labor organization (Awad Saad , 2002).

Mohamad Elmuntasir Ahmed, professor at the Faculty of Engineering and Architecture at Khartoum University, said "the construction industry in Sudan is changing use . they are cutting the green areas in Khartoum and creating residential areas . it is not every well planned , and is already having a negative impact on the quality of water and soil .the long term danger is that it will lead to water scarcity and other socio-economic and health impacts ".

In the absence of guideline to regulate which building products can be imported, certain contractors are using hazardous materials , he adds

"these materials will introduce chemicals that can harm the environment and the health of residents. We find that flame retardants used in construction are sources of toxins that can be transferred through the mother's breast milk to infants. it can also cause cancer. The atmospheric environment is also affected by these chemical".

2-23-3 Fundamentals of human resource management :

Human resource management (HRM) is arguably one of the oldest management concepts. It provides an organization with competitive edge over its competitors. Broadly, HRM can be defined as a coherent approach to the management of an organization's most valued assets; the people working there who individually and collectively contribute to the achievement of its objectives (Armstrong, 2006). In essence, it is the people practices and ranges from hiring new employees to developing them into successful organizational members to managing their separation from the company. Also, HRM is often used to change the attitude and behavior of employees toward the organization, which could result in better organization's performance. Human resource (HR) professionals administer these programs and can be generalists or specialists. Generalists have some knowledge about each HR function, while specialists are experts in one particular function such as recruitment, labor relations, or training (Armstrong, 2006).

In order to maximize the effectiveness of human resource management, there should have the following aligned activities:

- Strategic human resource management.
- Job analysis.
- Recruitment and selection.
- Training and development.

- Career development.
- Performance management.
- Compensation and benefits.
- Discipline.
- Safety and health.

(Pfeffer, 1998) described that HRM activities that promote a sustainable path to competitiveness should involve the following:

- Employment security.
- Selective recruiting.
- High wages.
- Incentive pay.
- Employee ownership.
- Information sharing.
- Participation and empowerment.
- Teams and job redesign.
- Training as skill development.
- Cross-utilization and cross-training.
- Symbolic egalitarianism.
- Wage compression.
- Promotion from within.
- Long-term perspective.
- Measurement of practices.
- Overarching philosophy.

2-23-4 The challenges of managing people in construction:

The ability to attract , retain and develop talented employees is a key feature of successful businesses. People are an

organization's most valuable asset and this is especially true in relatively low-tech, labor-intensive industries such as construction. However, people also represent the most difficult resource for organizations to manage. Unlike physical assets, people have their own individual needs which must be met and idiosyncrasies which must be managed if they are to contribute to organizational growth and development. People are individuals who bring their own perspectives, values and attributes to organizational life, and, when managed effectively, these human traits can bring considerable benefits to organizations (Mullins, 1999). However, when managed poorly they have the potential to severely limit organizational growth and threaten the viability of a business. There are countless examples of corporate and project crises in the construction sector which have arisen as the result of people's behavior , and it would seem that human resource management (HRM) has the potential to eliminate more construction risks than any other management approach. (Loose more, 2000).

2-23-5 Working Environments:

According to the (CIDB ,2004) there are several causes why the local workers were less keen to participate in the construction sectors; the practice of wages payment by day, uncomfortable work environment and the safety at construction site, the contractors also contribute to the pattern of the sector, when they tend to employ foreign workers rather than local. This is also supported by (Bodapati and Naney,1998) stated that working environment in construction are not attractive whereas the scope of work are difficult, with unsuitable atmosphere and the nature of work sometimes considered as dangerous .

2-23-6 Wages and Benefit:

ILO (2001) reported that in many countries, piece work is the predominant wage form for temporary worker in the construction industry. Most of them are forced to work for long hours. Others choose to do so, either because the rates of payment are so low or simply because they want to earn as much as possible while work is available. In the United States, recent research revealed that self-employed construction workers are paid per shift and the shift is normally ten to twelve hours per day for six day per week.

2-23-7 Career Prospects:

According to (ILO, 2001) public has considered construction sector as a sector which offer a vague career path. (Dale Wissman , 2002) mention that construction sectors was identified as a sectors that has a tough job , lower paid, inadequate training and an industry which has limited career path. London West Learning and Skill Council (2004) in their report "Building your future" has reported similar factors that prevent a person from choosing the construction industry as career choice. These factors include:

- The image of the industry itself.
- Culture in the construction industry.
- Career prospect are not clear.
- Recruitment is not systematic.
- Lack of support from certain parties to encourage local residents to choose the construction industry as career.
- The focus at the school level is stressed to the purely academic of vocational subject.

- Lack of information resources in the schools that provide vocational training.
- Lack of awareness among career advisor about the opportunities offered by the construction industry in terms of income and career development.

2-23-8 Construction Industry and HRM Practices:

Unlike many other industries whose performances are enhanced by new emerging technologies, construction industry is still a labor-intensive and low-tech sector; as a result, human capital is the most important and very often the most expensive resource deployed within it. (Loosemore et al, 2003).

According to (Huemann *et al* ,2007) construction projects have the following characteristics that make HRM policies and practices different from those of the other industries employing routine organization:

- Managing by projects as the strategy of the company.
- Temporary nature of projects.
- Dynamisms.
- Project portfolio resource and multirole demands.
- Specific management paradigm.

In addition, it was also found that construction industry is a male-dominate culture (Loose more *et al*., 2004).

These are the main factors affecting the use of HRM in construction industry. The first two factors:

- Managing by projects.

- Temporary nature of projects, resulted in fundamentally different HRM models in classical managed companies and project-oriented companies like construction companies. (Huemann *et al*. (2007)

2-23-9 Communication:

Distraction and even covering up problems that may expose internal weaknesses to them. However, ironically, the occasional involvement of outsiders Communication is probably the most important enabler of effective HRM practices, but, when poor, it also has the potential to severely limit their effectiveness. HRM communications must have an internal and external dimension. The internal dimension must focus on ensuring effective communications between managers and workers in different parts of an organization, particularly project staff and central HRM departments. In contrast, the external dimension should focus on communications with external interest groups such as governments, pressure groups, local communities and unions. These represent important stakeholders in all organizations, and ignoring them can lead to numerous problems. (Loosemore, 2000) found that in construction projects defensiveness to outsiders can be a problem. On some projects the pressures, cohesion, loyalties, focus and momentum that can develop become so intense that the workers effectively seal themselves off from the outside world, considering outsiders as an unnecessary who are unfamiliar with a project is often the most effective means of detecting potential problems. Their exclusion only increases a project's crisis-proneness.

2-23-10 Staffing the structure with suitable people:

This staffing function is also known as 'employee resourcing' and forms one of the most challenging aspects of the SHRM function. The major components of employee resourcing are recruitment and selection, deployment and team formation, performance management, retention and training, career development, dismissal and redundancy (Taylor, 1998).

Employee resourcing activities aim to ensure that the right numbers of employees with the right skills and competencies are in the right place at the right time. This inevitably results in a balancing act, in which managers have to consider longer-term strategic considerations while providing immediate solutions for the shorter-term operational issues (Beardwell and Holden, 1997). Thus, the resourcing function embodies much of what many people would traditionally consider as forming the core aspects of SHRM.

2-23-11 Role of HR managers:

The functions and responsibility of a human resource manager might include:

- Determining the need for staff.
- Recruiting and training temporary and permanent staff as required.
- Managing employee payroll , and compensation .
- Communicating with employees.
- Resolving disputes.
- Managing employee relations.
- Ensuring equal opportunities.
- Making sure that site facilities are suitable and well-maintained.

2-23-12 project human resource management:

Project human resource management includes the processes that organize, manage, and lead the project team. The project is comprised of the people with assigned roles and responsibilities for completing the project. Project team members may have varied skill sets , may be assigned full or part-time , and may be added or removed from the team as the project progresses. Project team members may also be referred to as the project's staff. Although specific roles and responsibilities for the project team members are assigned, the involvement of all team members in project planning and decision making is beneficial. Participation of team member during planning adds their expertise to the process and strengthens their commitment to the project.(PM,2013)

2-23-13 Project human resource management processes:

- Plan human resource management: The process of identifying and documenting project roles , responsibilities , required skills , reporting relationships , and creating a staffing management plan .
- Aquire project team: The process of confirming human resource availability and obtaining the team necessary to complete activities.
- Develop project team: The process of improving competencies, team member interaction, and overall team environment to enhance project performance.
- Manage project team : The process of tracking team member performance , providing feedback, resolving issues, and managing changes to optimize project performance.(PM,2013)

CHPTER THREE

METHODOLOGY

This study is totally based on existing literature. The main purpose of this research is to integrate the viewpoints of different companies and to make a conclusion on the basis of the literature

This chapter clarifiers the methodology which were followed and the investigation beyond the problem of the research to achieve the results and describing the tools that used to undertake the investigation . It also describes the characteristic of the research sample and method of analysis

3-1 Methodology :

The mother tongue of most people who are working in construction industry in Sudan is Arabic language so it was necessary to provide an Arabic questionnaire formant in order to enlarge the respondent population parameter . to speed up the response , the questionnaire was distributed personally and collected by hand .

This study is totally based on existing literature. The main purpose of this research is to integrate the viewpoints of different companies and to make a conclusion on the basis of the literature

3-2 Questionnaire Design :

The questionnaire was designed to meet the researcher aims and objectives . firstly the information presented in the previous chapters helped to widen the researcher's knowledge in the area of concern and creating an awareness of the issues that might not otherwise have been taken into consideration . A provisional version of the questionnaire was then developed to cover all aspects needed to accomplish the purpose of the research .

The aim of the questionnaire is to identify the role of human resources management on attaining goals of the project with some limitation in human resource management because there are aspects have been chosen in area of human resource management which are training, motivation and recruitment

The questionnaire included two parts related to the role of human resource management in construction projects , the first part consist of general information about respondents , and the second part consist of the role of motivation , training and recruitment on time quality and cost of the project . The respondents were asked to indicate, based on their experience in construction industry.

3-3 Data Collection:

Data was collected using a structured questionnaire contributed on selected construction industry organizations (construction and consultant) operating in Khartoum, Sudan. Proportional stratified sampling and simple random sampling method were utilized to collect data.

Follow-up efforts including telephone calls and reminders on some of the respondents with repeat visits were made. In the process seventy two completed questionnaires were received out of ninety five that were distributed .

3-4 Research Sample:

All types of Construction Companies in Khartoum State were chosen as the statistical population of the study. The organizations that the research subject contains many fields. It includes roads and bridges companies, construction companies, consultant companies and contracting companies.

The sampling was done through the purposive sampling method, one of the non-probabilistic techniques. Proportional stratified sampling and simple random sampling method were utilized.

3-5 Research strategy:

Selecting a research method is an important decision , the researchers needs to the approaches to know which of them will satisfy the objective of the study and will fit with the information available and with the information needed. Two types of research strategies are used in this

study , quantitative and qualitative research . Quantitative approach is used to gather factual data and to study relationships between facts and how such facts and relationship accord with theories and findings of any research executed previously, and qualitative approach seeks to gain insights understand people's perception

3-6 Data Analysis:

The collected data were analyzed using statistical techniques. An advanced and accurate analysis method was needed to arrange and assort the large quantum of data in a systematic, fast and accurate as possible and reliable way. For this purpose a computer software was used specially SPSS (Statistical Package for Social Sciences)

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

The chapter addresses analysis , discussions and interpretations for the collected data

Data have been analyzed using SPSS (Statistical Package for the Social Sciences). This program was released in the first version in its first version in 1968 after being developed by Norman H.Nine (Daniel Clawson ,1998) .SPSS is among the most widely programs for statistical analysis in social science .

4-1 Part (1): General information:-

1. **What is the type of sector you are working at ?**

Table (4. 1) shows what the types of sectors for the sample

		Frequency	Percent
Valid	Public	24	33.3
	Private	43	59.7
	Both	5	6.9
	Total	72	100.0

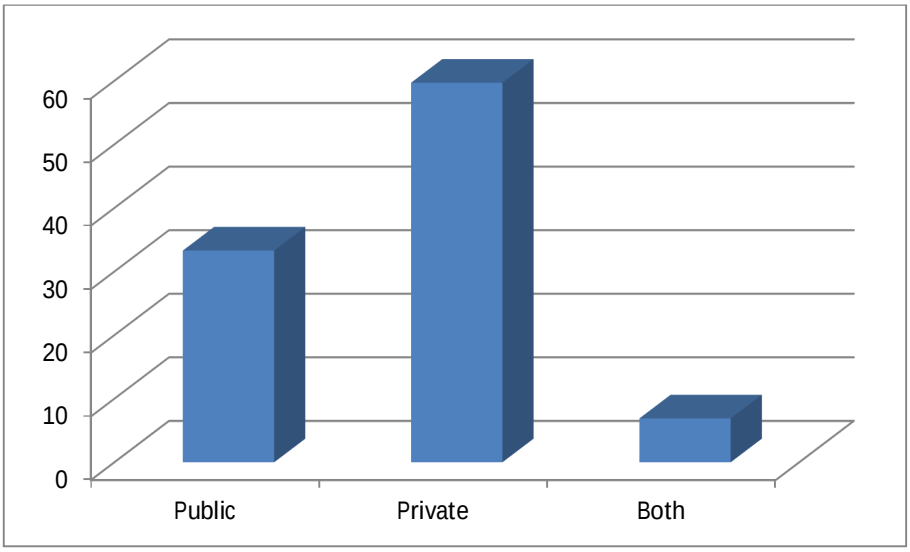


Fig. (4. 1) Frequencies - What are the types of sectors for the sample

The sample is well graded including both public and private sectors

2. What is your business?

Table (4. 2) shows what the businesses for the sample

		Frequency	Percent
Valid	Contractor	40	55.6
	Consultant	18	25.0
	Client or client representative	14	19.4
	Total	72	100.0

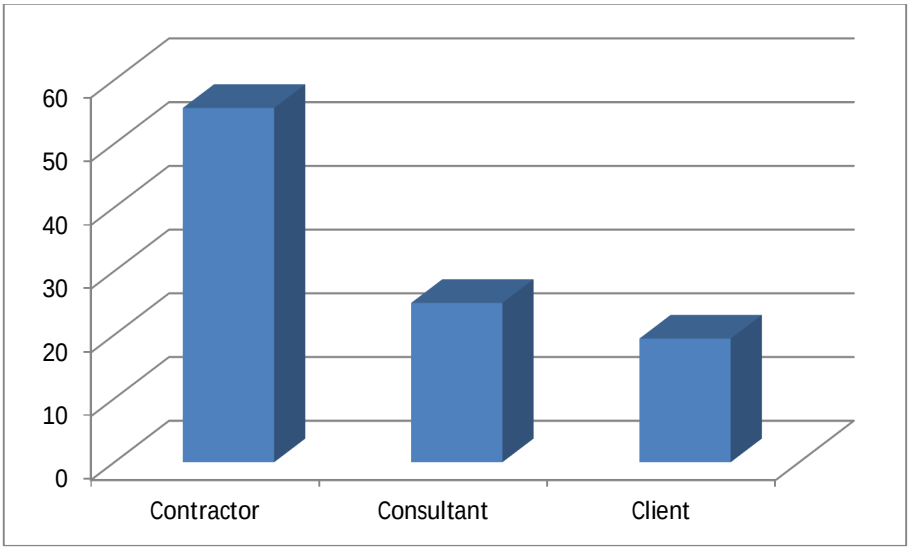


Fig. (4. 2) Frequencies – What are the businesses for the sample

The distribution of questionnaires cover contractors , consultants and client or client representatives

3. How long have you been dealing with construction projects?

Table (4. 3) How long have the sample dealing with construction projects

		Frequency	Percent
Valid	0-5(years)	26	36.1
	6-10(years)	18	25.0
	11-15(years	21	29.2
	More than 15(years)	7	9.7
	Total	72	100.0

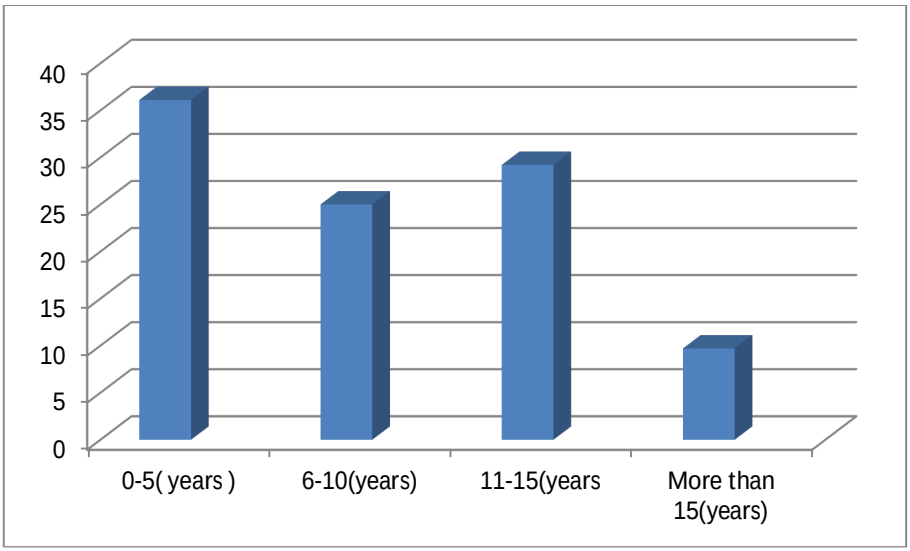


Fig. (4. 3) Frequencies – How long have the sample dealing with construction projects

There are variety of experiences for the sample , so different points of views have been obtained

4. What is/are the size of project /projects you are working at ?

Table (4. 4) shows the size of the projects that the sample are working at

		Frequency	Percent
Valid	Small	6	8.3
	Medium	44	61.1
	Large	22	30.6
	Total	72	100.0

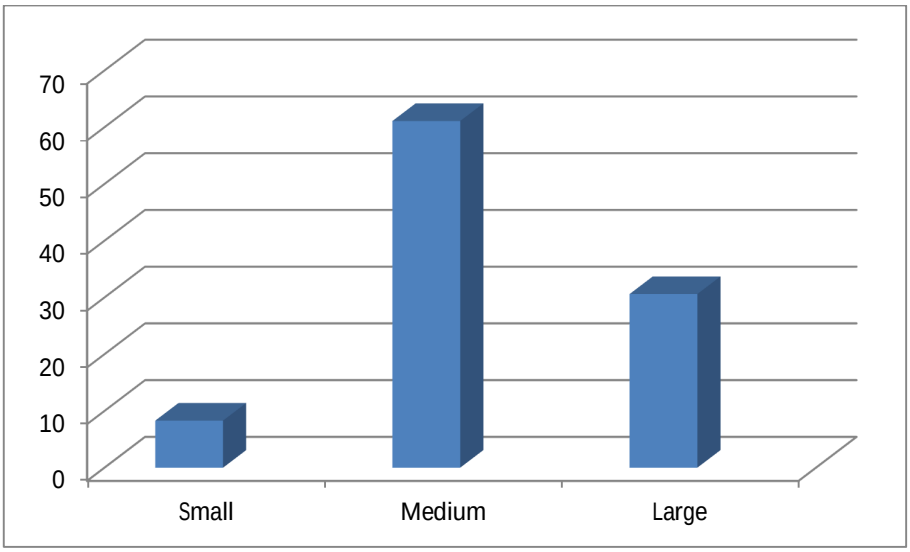


Fig. (4. 4) Frequencies- The size of the projects that the sample are working at

The distribution of questionnaires not targeting a certain size of companies whether they are small , medium and large rather it was distributed on several size of companies

5. Level of education?

Table (4. 5) shows the level of education for the sample

		Frequency	Percent
Valid	Diploma	5	6.9
	Bachelor	48	66.7
	Master Degree	16	22.2
	PHD	3	4.2
	Total	72	100.0

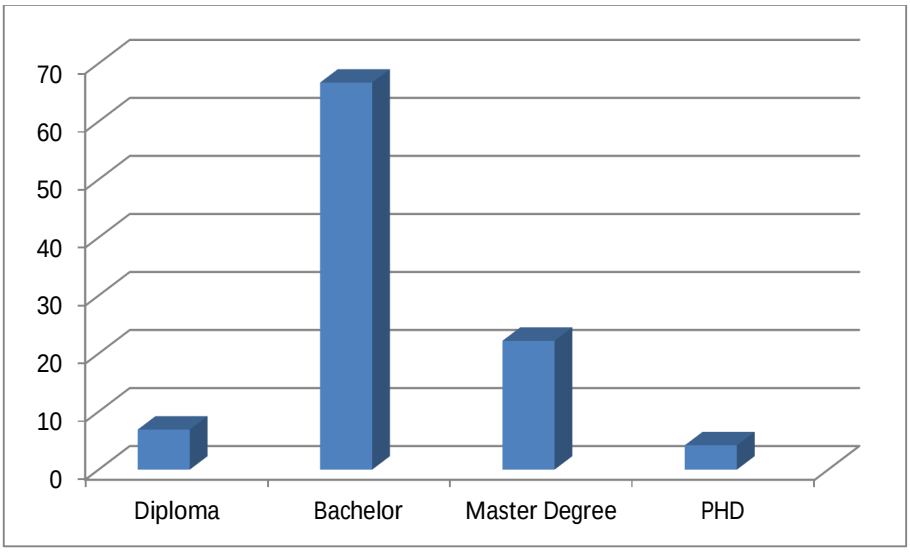


Fig. (4. 5) Frequencies- The level of education for the sample chart

Different level of education have been covered so as to have different point of views

4-2 Part (2): Questions of the questionnaire:

1. **Recruitment and selection of qualified labors appear directly in the completion of the project on time.**

Table (4. 6) shows the views of the sample in: recruitment and selection of qualified labors appear directly in the completion of the project on time

		Frequency	Percent
Valid	Disagree	2	2.8
	Neutral	2	2.8
	Agree	15	20.8
	Strongly Agree	53	73.6
	Total	72	100.0

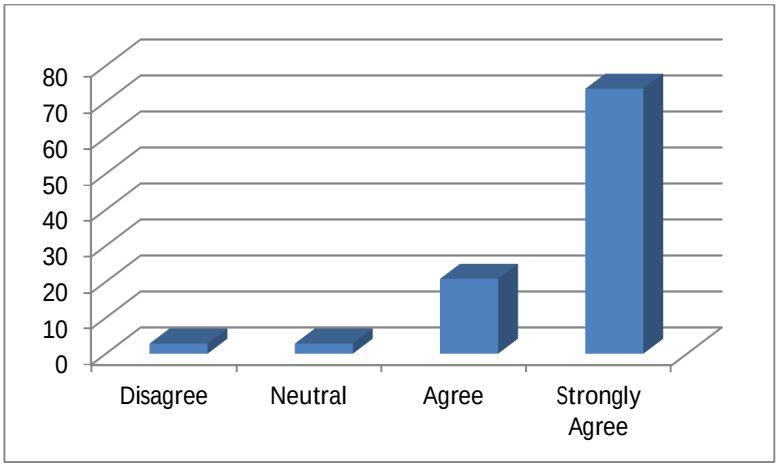


Fig. (4. 6) Frequencies- Recruitment and selection of qualified ...

The greatest percentage 73.6% agree that recruitment and selection of qualified labors have great impact on the time of the project

2. Recruitment and selection of qualified labors reduce mistakes.

Table (4. 7) shows the views of the sample in: Recruitment and selection of qualified labors reduce mistakes

		Frequency	Percent
Valid	Disagree	1	1.4
	Neutral	2	2.8
	Agree	26	36.1
	Strongly Agree	43	59.7
	Total	72	100.0

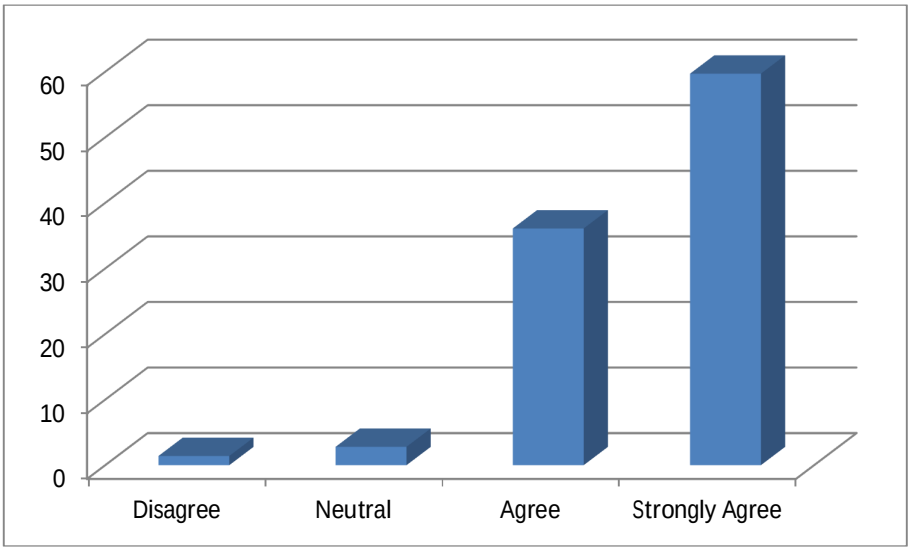


Fig. (4. 7) Frequencies- Recruitment and selection of … etc

There are 59.7% agree that mistakes in construction projects are reduced through recruitment and selection of qualified labors and that helps executing tasks of the project on time

3. Recruitment and selection of qualified labors benefits the current labors of the company.

Table (4. 8) shows the views of the sample in : Recruitment and selection of qualified labors benefits the current labors of the company

		Frequency	Percent
Valid	Disagree	6	8.3
	Neutral	9	12.5
	Agree	36	50.0
	Strongly Agree	21	29.2
	Total	72	100.0

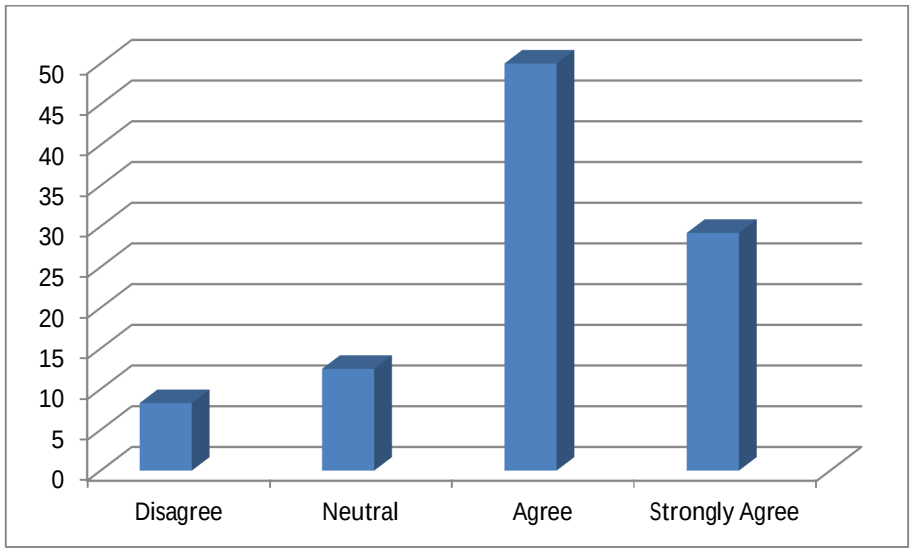


Fig. (4. 8) Frequencies- Recruitment and selection of qualified labors benefits … etc

50% from the sample agree that recruitment and selection of qualified labors benefits the current labors of the company and that for sure appear positively in the time of the project

4. Recruitment and selection of qualified labors reduce the cost of reworking.

Table (4. 9) shows the views of the sample in: Recruitment and selection of qualified labors reduce the cost of reworking

		Frequency	Percent
Valid	Disagree	3	4.2
	Neutral	8	11.1
	Agree	37	51.4
	Strongly Agree	24	33.3
	Total	72	100.0

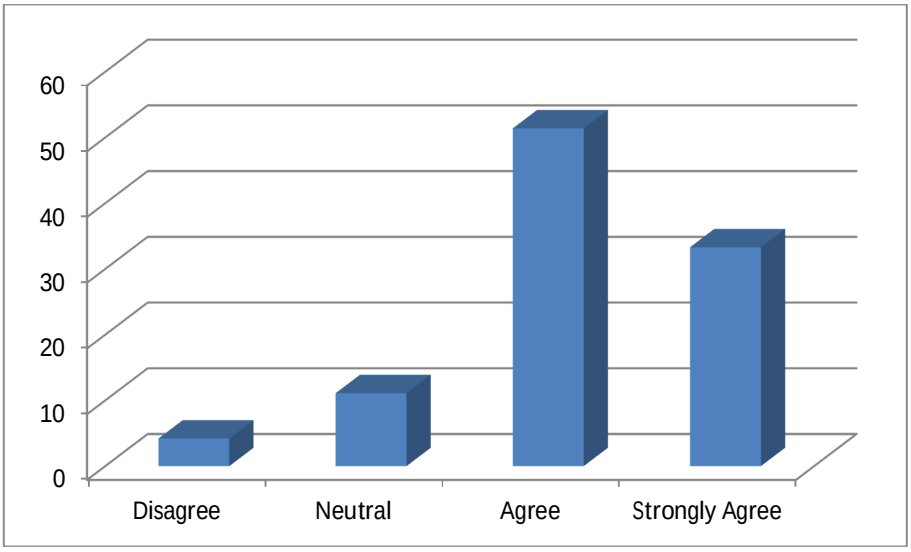


Fig. (4. 9) Frequencies- Recruitment and selection … etc

51.4% agree that recruitment and selection of qualified labors help in fulfilling tasks with the cost as planned, then the cost of reworking is reduced

5. Recruitment and selection of qualified labors reduce the waste of material.

Table (4. 10) shows the views of the sample in: Recruitment and selection of qualified labors reduce the waste of material

		Frequency	Percent
Valid	Disagree	2	2.8
	Neutral	2	2.8
	Agree	31	43.1
	Strongly Agree	37	51.4
	Total	72	100.0

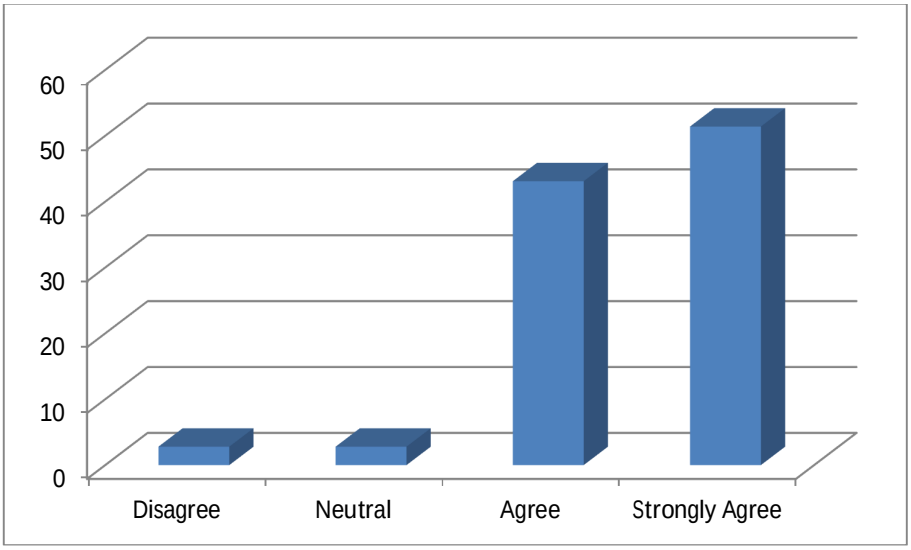


Fig. (4. 10) Frequencies- Recruitment and selection of qualified labors reduce the waste of … etc–Bar chart

51.4 % agree that recruitment and selection of qualified labors that has great impact on the cost of the project by reducing waste of material.

6. Recruitment and selection of qualified labors appear in the termination of the project with the expected cost.

Table (4. 11) shows the views of the sample in: Recruitment and selection of qualified labors appear in the termination of the project with the expected cost

		Frequency	Percent
Valid	Disagree	4	5.6
	Neutral	19	26.4
	Agree	33	45.8
	Strongly Agree	16	22.2
	Total	72	100.0

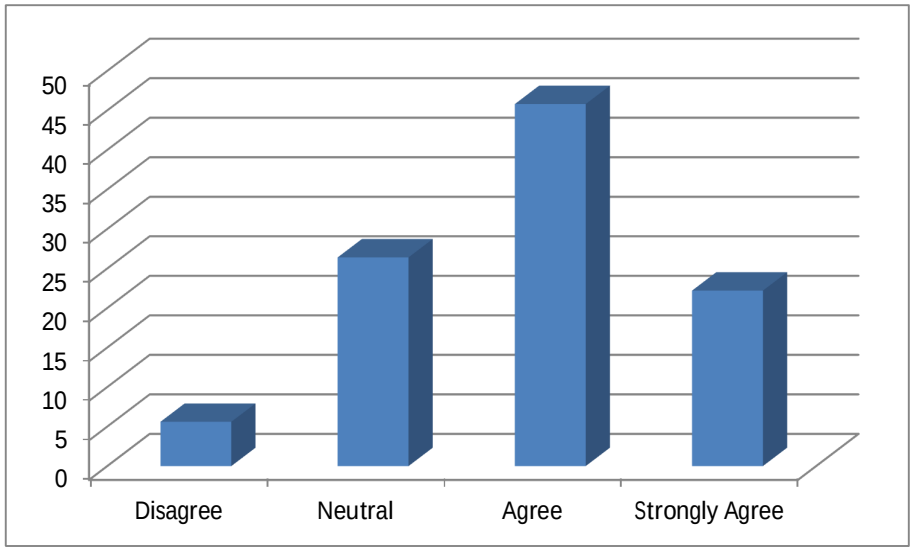


Fig. (4. 11) Frequencies Recruitment and selection of qualified labors appear in the termination … etc

Recruitment and selection of qualified labors are manifested obviously in termination of the project with the planed cost and 45.8 % agree with that

7. The recruitment and selection of labors according to their experience.

Table (4. 12) shows the views of the sample in: The recruitment and selection of labors according to their experience

		Frequency	Percent
Valid	Disagree	5	6.9
	Neutral	9	12.5
	Agree	40	55.6
	Strongly Agree	18	25.0
	Total	72	100.0

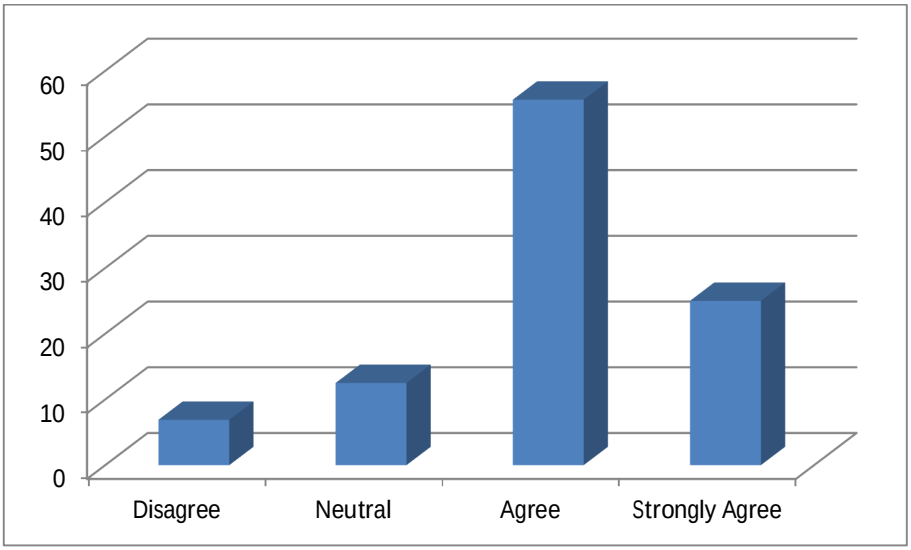


Fig. (4. 12) Frequencies- The recruitment and selection of labors according … etc

55.6% agree that recruitment and selection of labors in construction sectors are done according to their experience so as to achieve a high level of quality

8. The work of recruited and selected labors according to the specifications.

Table (4. 13) shows the views of the sample in: The work of recruited and selected labors according to the specifications

		Frequency	Percent
Valid	Strongly Disagree	2	2.8
	Neutral	22	30.6
	Agree	31	43.1
	Strongly Agree	17	23.6
	Total	72	100.0

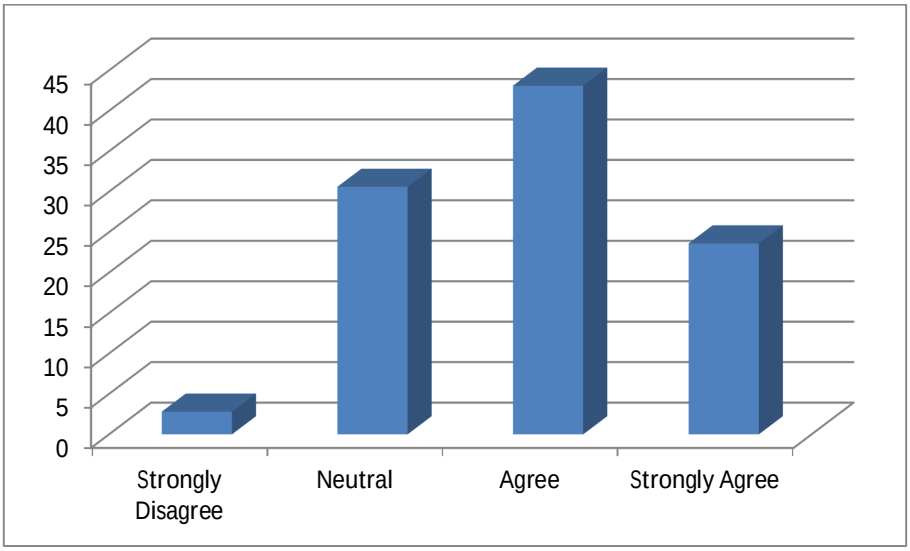


Fig. (4. 13) Frequencies- The work of recruited and .. etc

43.1% agree that the quality of recruited and selected labors complies with specifications

9. There is no reworking for the recruited and selected labors.

Table (4. 14) shows the views of the sample in: There is no reworking for the recruited and selected labors

		Frequency	Percent
Valid	Strongly Disagree	4	5.6
	Disagree	12	16.7
	Neutral	31	43.1
	Agree	18	25.0
	Strongly Agree	7	9.7
	Total	72	100.0

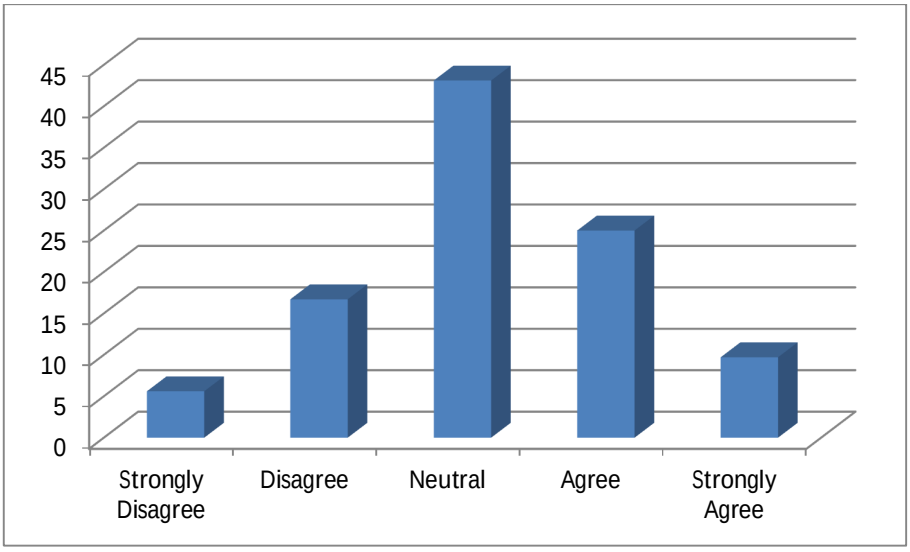


Fig. (4. 14) Frequencies-There is no reworking... etc

43.1 % are neutral with work's quality of recruited and selected labors

10. If you feel that physical motivation (wage or otherwise) is insignificant or unfair the quality of the work will be declined.

Table (4. 15) shows the views of the sample in: If you feel that physical motivation (wage or otherwise) is insignificant or unfair the quality of the work will be declined

	Frequency	Percent
Strongly Disagree	2	2.8
Disagree	13	18.1
Neutral	12	16.7
Agree	27	37.5
Strongly Agree	18	25.0
Total	72	100.0

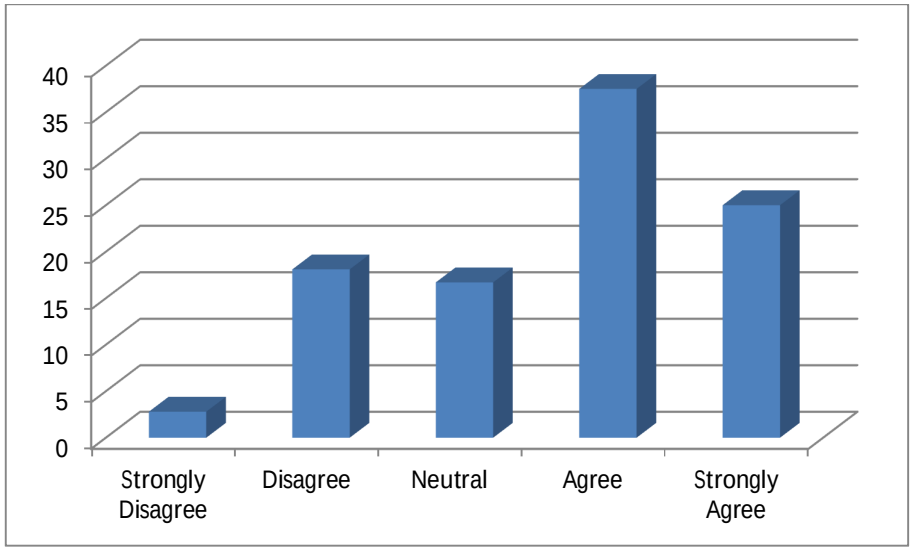


Fig. (4. 15) Frequencies- If you feel that … etc

37.5 % agree that if there is injustice or the labors have been wronged in terms of (wage or otherwise) the quality of the work will be declined

11. If the management treats you poorly or not giving you enough respect, the level of your quality will be declined.

Table (4. 16) shows the views of the sample in: If the management treats you poorly or not giving you enough respect, the level of your quality will be declined

		Frequency	Percent
Valid	Strongly Disagree	3	4.2
	Disagree	13	18.1
	Neutral	14	19.4
	Agree	19	26.4
	Strongly Agree	23	31.9
	Total	72	100.0

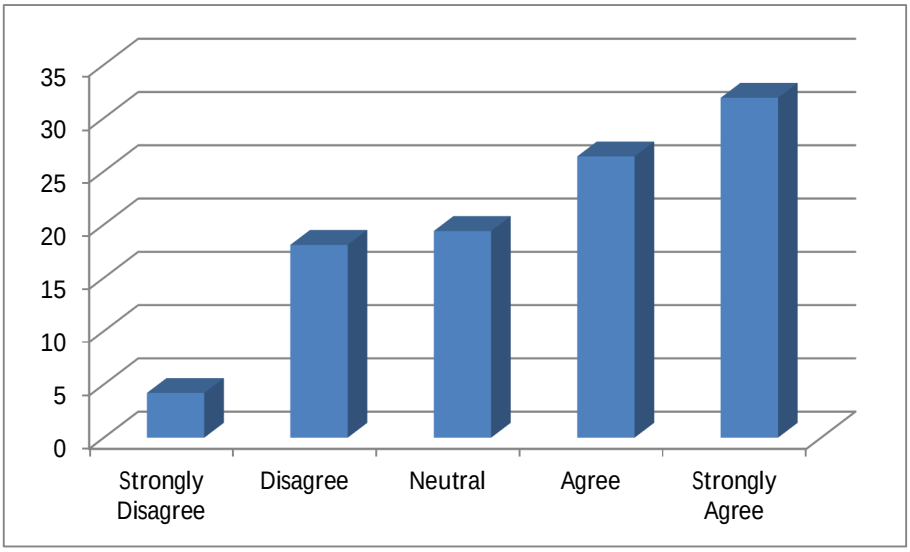


Fig. (4. 16) Frequencies- If the management … etc

31.9 % agree that there is strong relationship between motivation and the quality of the work , so if there is no respect from manger towards labors the quality of the work will be diminished

12. If you tell the managers about your suggestions or ideas for the development of the work or for solving problems at the company for example quality problems will be put in their consideration.

Table (4. 17) shows the views of the sample in: If you tell the managers about your suggestions or ideas for the development of the work or for solving problems at the company for example quality problems will be put in their consideration

		Frequency	Percent
Valid	Strongly Disagree	2	2.8
	Disagree	6	8.3
	Neutral	20	27.8
	Agree	40	55.6
	Strongly Agree	4	5.6
	Total	72	100.0

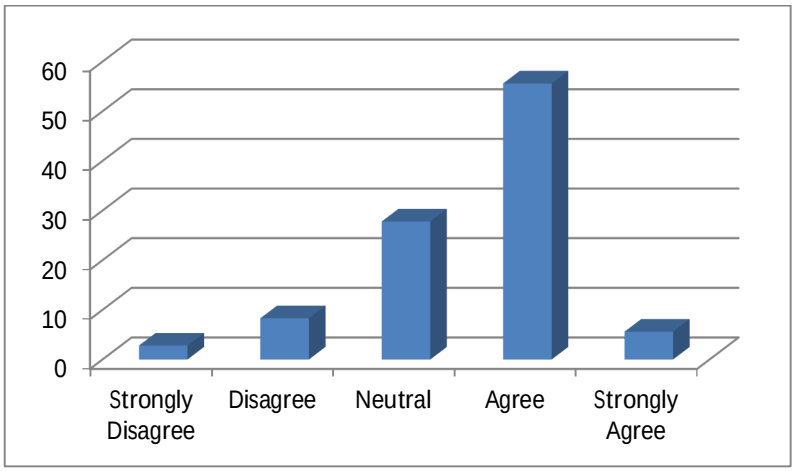


Fig. (4. 17) Frequencies- If you tell the managers … etc

55.6 % agree that if labors tell their manger about some problem in their work the managers listen to them and motivate them so that pushing them to achieve quality in work

13. Motivation affects your performance, pushing you to accomplish your tasks on time.

Table (4. 18) shows the views of the sample in: Motivation affects your performance, pushing you to accomplish your tasks on time

		Frequency	Percent
Valid	Strongly Disagree	1	1.4
	Disagree	1	1.4
	Neutral	5	6.9
	Agree	33	45.8
	Strongly Agree	32	44.4
	Total	72	100.0

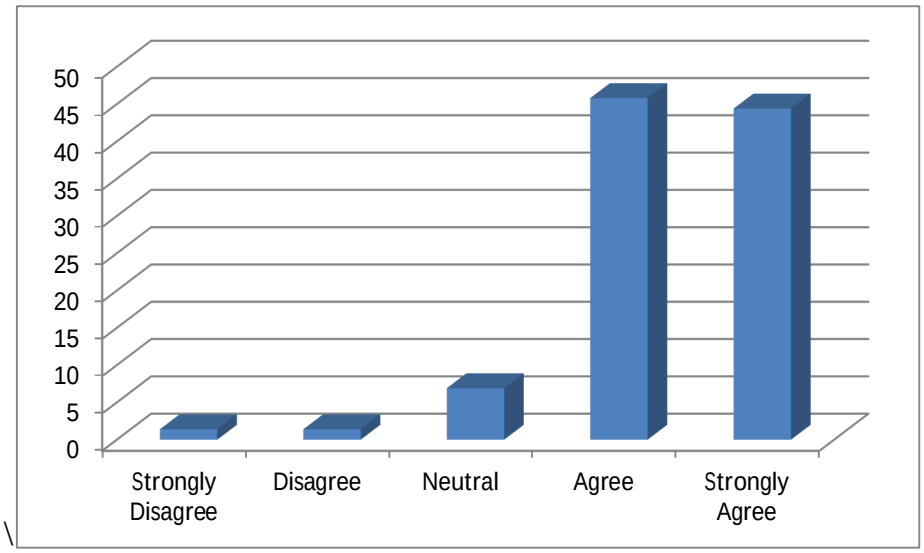


Fig. (4. 18) Frequencies- Motivation affects your ... etc–Bar chart

45.8% agree and 44.4% strongly agree that if labors are well motivated that help them to accomplish their tasks on time

14. You consider yourself as a good labor, fulfilling your job properly in your company

Table (4. 19) shows the views of the sample in: You consider yourself as a good labor, fulfilling your job properly in your company

	Frequency	Percent
Strongly Disagree	1	1.4
Neutral	4	5.6
Agree	47	65.3
Strongly Agree	20	27.8
Total	72	100.0

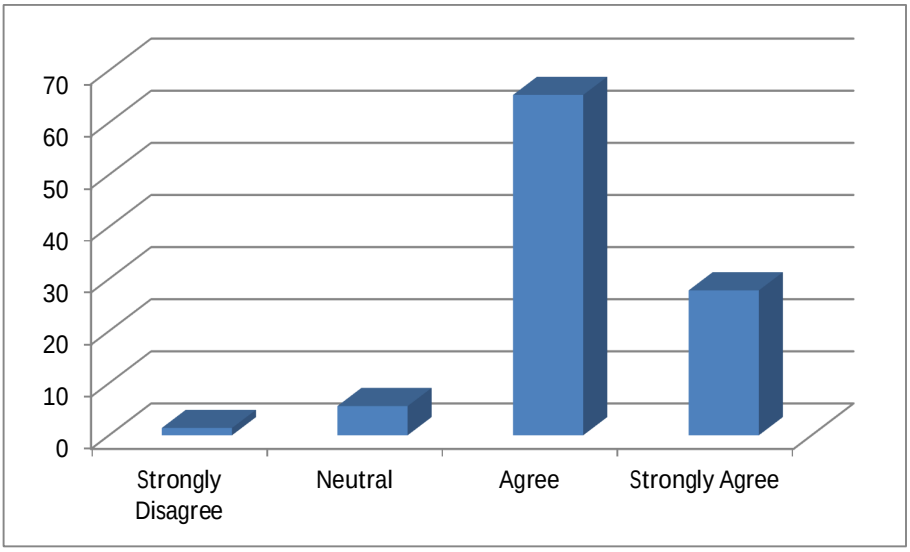


Fig. (4. 19) Frequencies - You consider yourself as … etc–Bar chart

65.3% agree that if labors feel that they are respected or they are important that helping in finishing their activities on time

15. The objective which the company's senior management aspires to reach are clear and understandable for you.

Table (4. 20) shows the views of the sample in: The objective which the company's senior management aspires to reach is clear and understandable for you

	Frequency	Percent
Strongly Disagree	3	4.2
Disagree	6	8.3
Neutral	9	12.5
Agree	41	56.9
Strongly Agree	13	18.1
Total	72	100.0

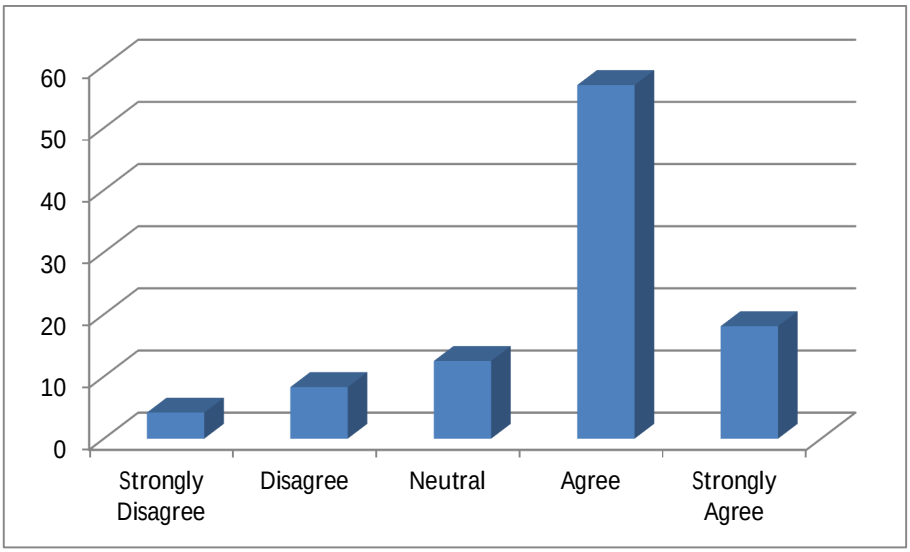


Fig. (4. 20) Frequencies - The objective which…etc

56.9% agree that if managers explain and discussing to labors their objectives that motivates them to make their tasks come to an end as planned

16. The company motivates the labors whom have not done mistakes.

Table (4. 21) shows the views of the sample in: The Company motivates the labors whom have not done mistakes

		Frequency	Percent
Valid	Strongly Disagree	5	6.9
	Disagree	8	11.1
	Neutral	28	38.9
	Agree	22	30.6
	Strongly Agree	9	12.5
	Total	72	100.0

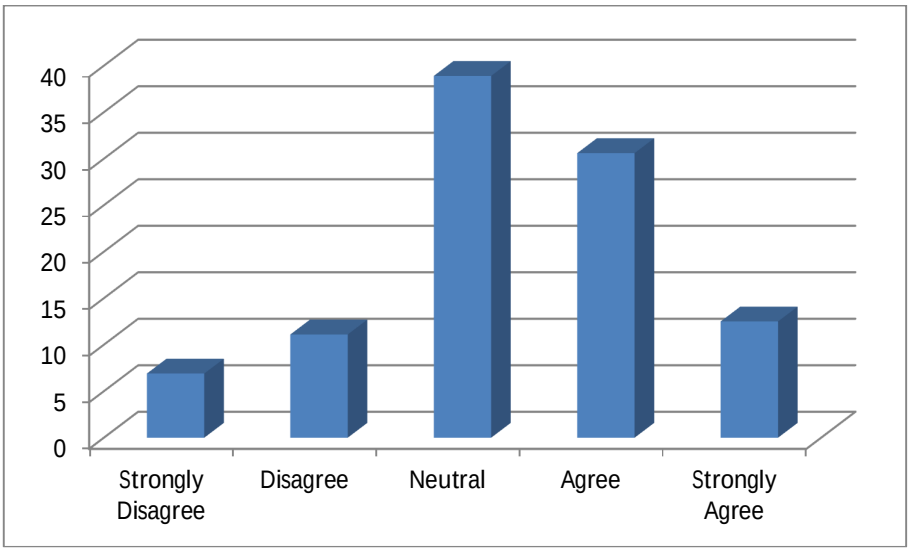


Fig. (4. 21) Frequencies - The company motivates … etc

There is an appreciation for labors who have not done mistakes in their works and according to that the company motivates them and there are 38.9 % from the sample neutral

17. Motivation helps in accomplishing the project with the expected cost.

Table (4.22) shows the views of the sample in: Motivation helps in accomplishing the project with the expected cost

	Frequency	Percent
Disagree	8	11.1
Neutral	17	23.6
Agree	29	40.3
Strongly Agree	18	25.0
Total	72	100.0

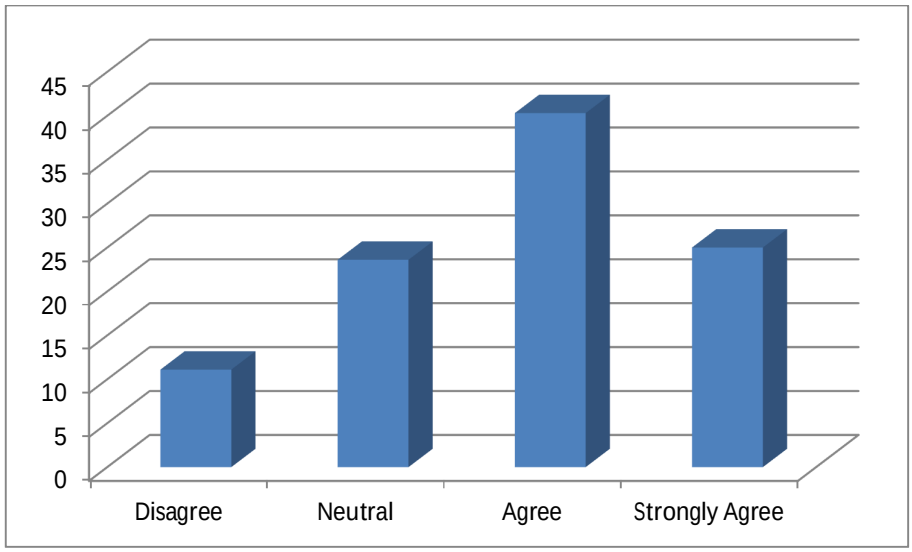


Fig. (4. 22) Frequencies - Motivation helps in … etc

40.3 % agree that motivation affects positively the cost of the project and it helps labors finishing their works as expected

18. Training improves the quality of the work.

Table (4. 23) shows the views of the sample in: Training improves the quality of the work

		Frequency	Percent
Valid	Neutral	1	1.4
	Agree	20	27.8
	Strongly Agree	51	70.8
	Total	72	100.0

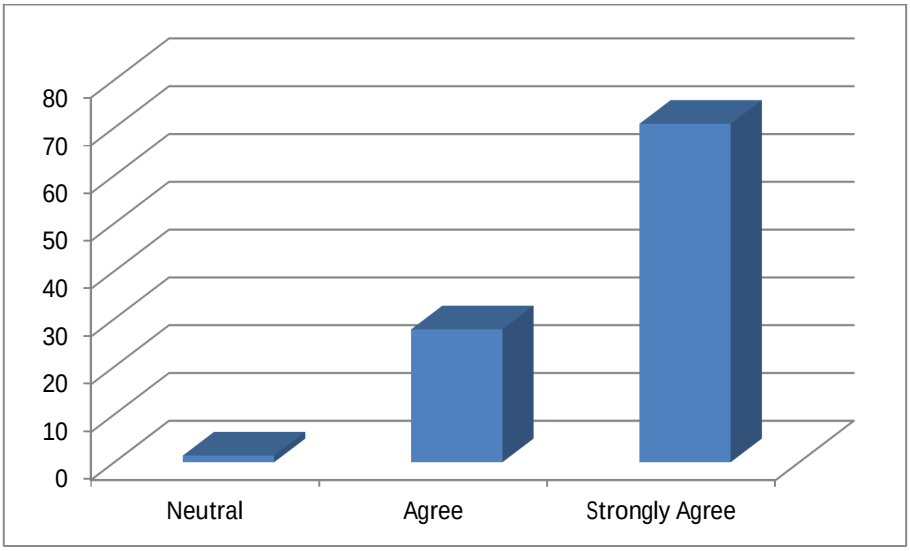


Fig. (4. 23) Frequencies Training improves … etc

70.8 % strongly agree that the level of the quality of the work is improved through training

19. Training enhances organization effectiveness and reputation.

Table (4. 24) shows the views of the sample in: Training enhances organization effectiveness and reputation

		Frequency	Percent
Valid	Neutral	2	2.8
	Agree	24	33.3
	Strongly Agree	46	63.9
	Total	72	100.0

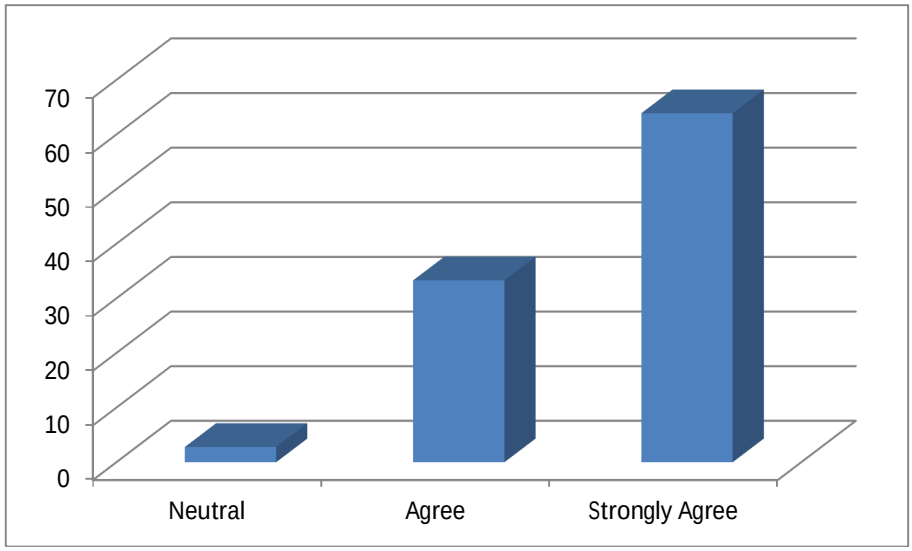


Fig. (4. 24) Frequencies Training enhances … etc

63.9 % strongly agree that through training the reputation of companies will be enhanced and images too and the essential aspect for companies is the quality of the work which spreads the reputation

20. Supervisors give the labors chances to tryout training on their current jobs.

Table (4. 25) shows the views of the sample in: Supervisors give the labors chances to tryout training on their current jobs

	Frequency	Percent
Strongly Disagree	3	4.2
Disagree	1	1.4
Neutral	25	34.7
Agree	32	44.4
Strongly Agree	11	15.3
Total	72	100.0

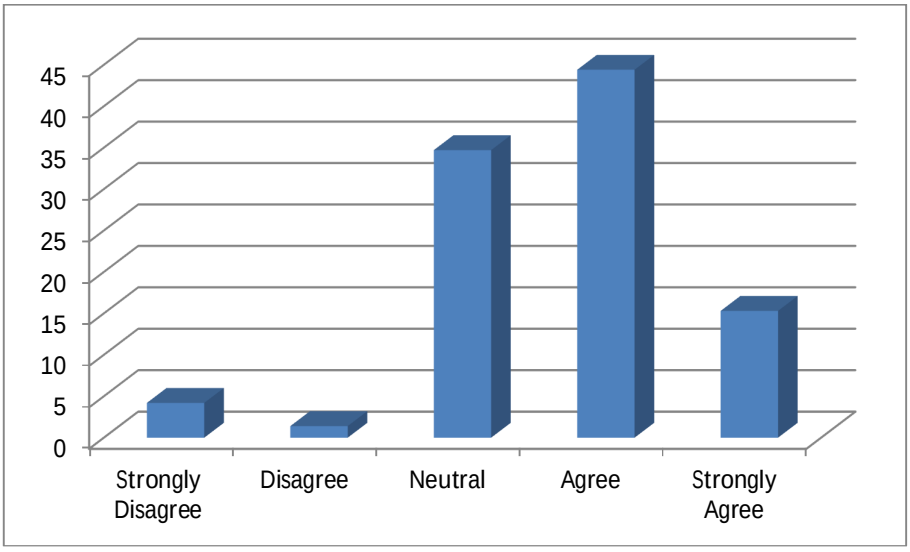


Fig. (4. 25) Frequencies- Supervisors give the .. etc

44.4% agree and 15.3 % strongly agree that mangers give labors opportunities to practice what they have been taught in training periods and that for sure improve the quality of the work

21. Training increases the awareness of the importance of time in the project.

Table (4. 26) shows the views of the sample in: Training increases the awareness of the importance of time in the project

		Frequency	Percent
Valid	Neutral	3	4.2
	Agree	28	38.9
	Strongly Agree	41	56.9
	Total	72	100.0

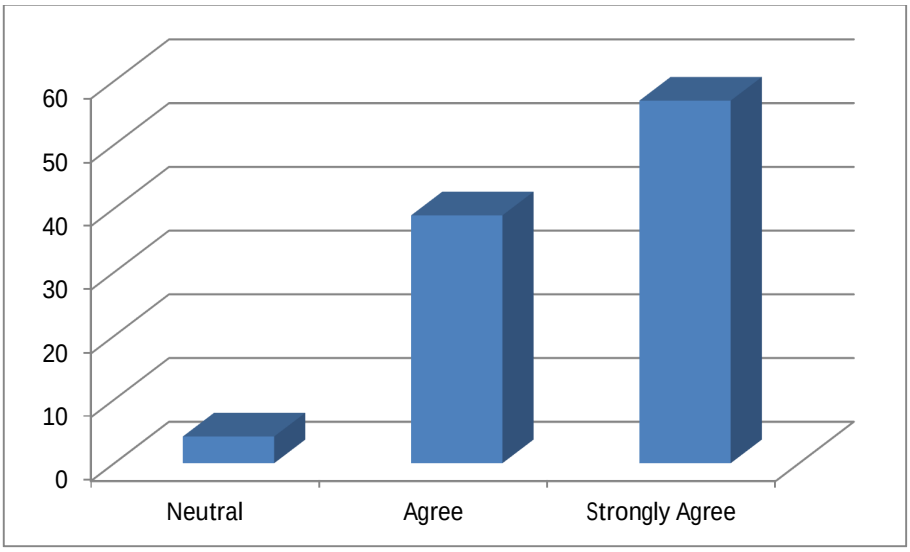


Fig. (4. 26) Frequencies- Training increases … etc

56.9% agree that training draw the attention to the importance of project's time

22. Training helps employees doing their tasks on time.

Table (4. 27) shows the views of the sample in: Training helps employees doing their tasks on time

	Frequency	Percent
Disagree	2	2.8
Neutral	8	11.1
Agree	29	40.3
Strongly Agree	33	45.8
Total	72	100.0

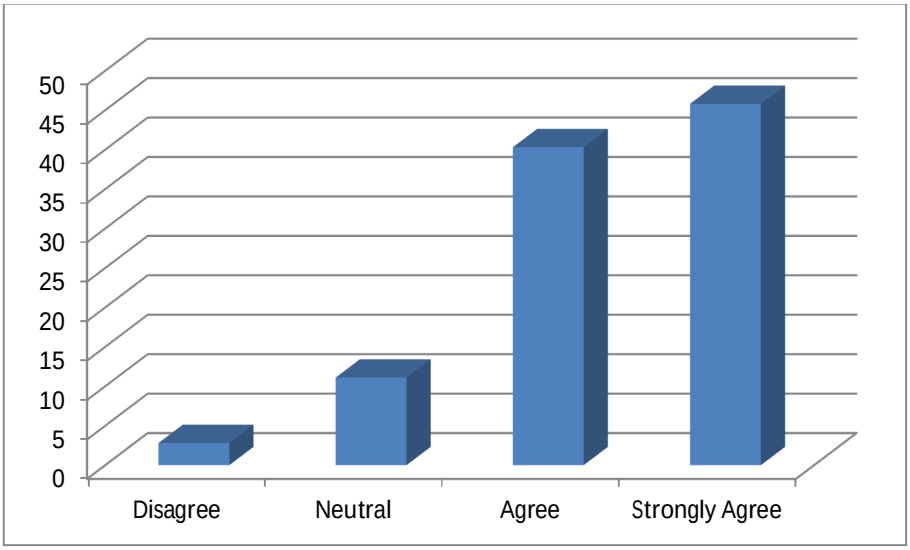


Fig. (4. 27) Frequencies- Training helps employees.. etc

40.3% agree and 45.8 % strongly agree that through training skills and abilities are improved and that facilitate accomplishing activities of the project on time

23. Training decreases the possibility of the project deviation from time.

Table (4. 28) shows the views of the sample in: Training decreases the possibility of the project deviation from time

	Frequency	Percent
Strongly Disagree	1	1.4
Disagree	1	1.4
Neutral	9	12.5
Agree	33	45.8
Strongly Agree	28	38.9
Total	72	100.0

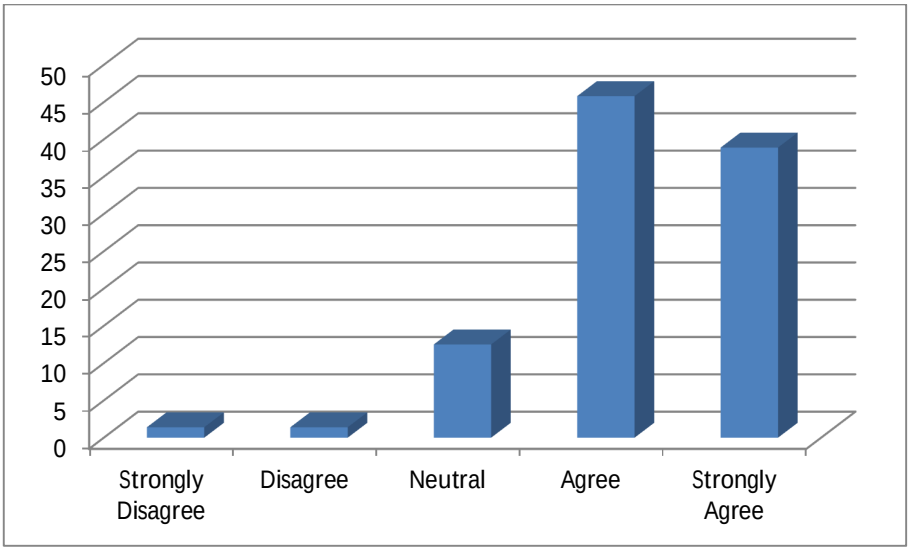


Fig. (4. 28) Frequencies- Training decreases … etc–Bar chart

45.8 % agree 38.9 % strongly agree that training decreases the probability on not achieving tasks of the project on time

24. Training decreases the expenditures in the project.

Table (4. 29) shows the views of the sample in: Training decreases the expenditures in the project

	Frequency	Percent
Strongly Disagree	1	1.4
Disagree	2	2.8
Neutral	9	12.5
Agree	31	43.1
Strongly Agree	29	40.3
Total	72	100.0

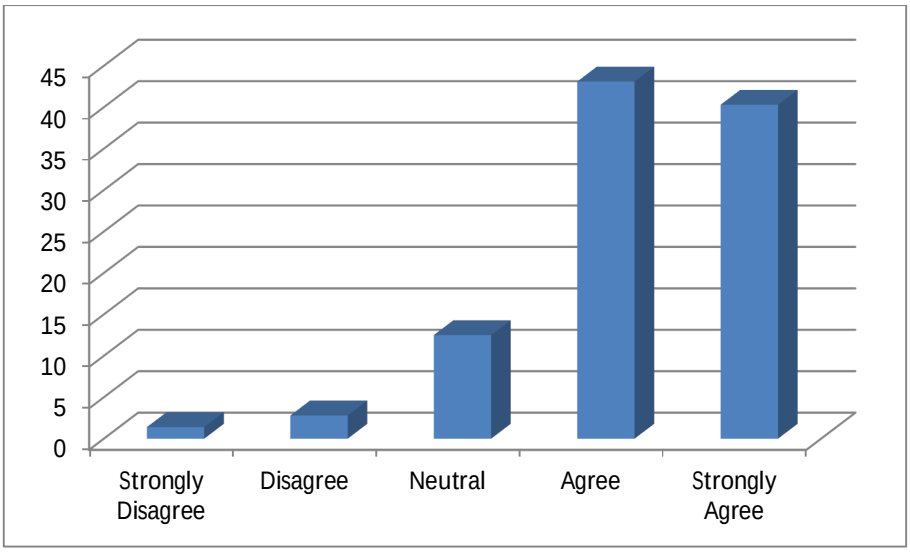


Fig. (4. 29) Frequencies- Training decreases the … etc

43.1 % agree and 40.3% strongly agree that through training the cost of the project will not be exceeded so training influence positively the cost of the project

25. Training reduces accidents of work, which affects positively the cost of the project.

Table (4.30) Shows the views of the sample in: Training reduces accidents of work, which affects positively the cost of the project

	Frequency	Percent
Disagree	1	1.4
Neutral	5	6.9
Agree	28	38.9
Strongly Agree	38	52.8
Total	72	100.0

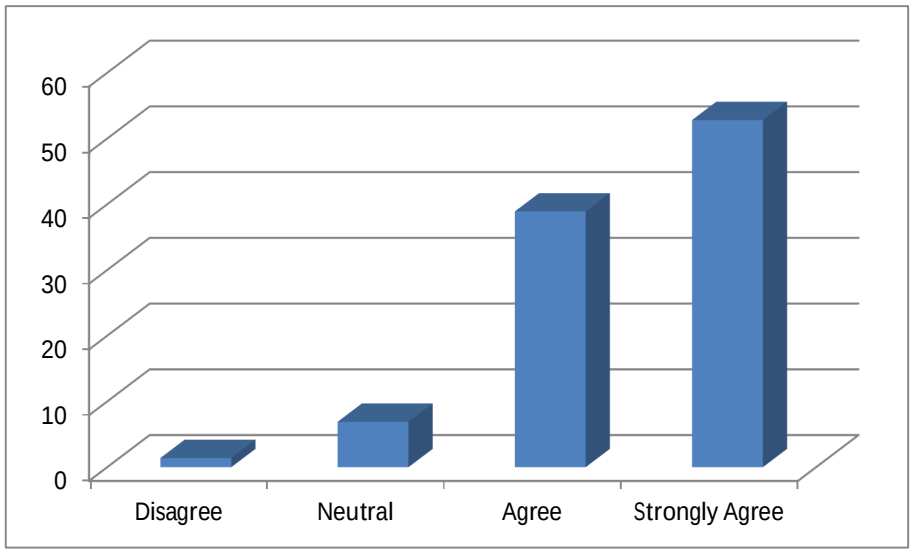


Fig. (4. 30) Frequencies-Training reduces accidents of … etc

52.8% strongly agree if labors are well trained that reduces the possibility of accidents on the project so that appear directly and positively in cost of the project

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5-1 Conclusion:

Paying the attention to the Human Resource Management is the most important factors to achieve the goals of the construction projects. Motivation, training and recruitment have strong impact on quality, time and cost of the construction projects. The results of this research verified these information .

From the research : 55.6%from the total percentage agree that (If you tell the managers about your suggestions or ideas for the development of the work or for solving problems at the company for example quality problems will be put in their consideration) , 44.4% from the total percentage strongly agree that (Motivation affects the performance, pushing to accomplish tasks on time), 25%from the sample strongly agree and 40.3%from the sample agree that (Motivation helps in accomplishing the project with the expected cost) **,** 70.8% from the sample strongly agree that(Training improves the quality of the work), 56.9%from the total percentage strongly agree that (Training increases the awareness of the importance of time in the project) and52.8% from the total percentage strongly agree that (Training reduces accidents of work, which affects positively the cost of the project).

5-2 Recommendations:

1- To achieve a constant success in field of construction, we have to spread the awareness of Human Resource Management and applying it with scientific and systematic way.
2- Permanent periods of training for developing skills and abilities and verifying the outputs of training.
3- Motivation is fundamental to achieve the goals which appear in raising the moral, rewarding, nice way of dealing with others…etc.
4- Recruitment is one of the basic requirements to accomplish the activities of a construction project with the planed cost and quality and within time.

5-3 Recommendations for further researches :

1- The relationship between Human Resource Management and Productivity in Construction Industry.
2- Reasons behind leaving job by labors in construction industry in Sudan.
3- The effect of internal and external environment on labors in Construction Industry in Sudan.

REFERENCES

- A.H Maslow (1943) A Theory of Human Motivation, psych - ological Review 50 (4) : 370 -96
- Andawei (2002) Effect of motivation on employee productivity: A study of manufacturing companies in Nnewi
- Arditi, D and Gunaydin , H ,(1998) Critical factors that Critical factors affecting quality performance in construction projects
- Armstrong ,M.(2006) The impact of strategic human resource management on organizational performance
- A.Taha(1992) Project Management Handbook Version 1.1 - July 2006 An introduction to strategic Human Resource Management
- Awad saad Hassan (2002) Symposium on architecture education in Sudan, published paper
- Awad saad Hassan (2005) Human Resources Management in Sudanese Building Industry, PHD Thesis.
- Ball,M.,(1998) Managing innovation in construction
- Barber, A. E. (1998) Recruitment employees: Individual and organizational perspectives,
- Beardwell,I.and Holden,L.(eds) (1997) Human Resources Management: A Contemporary Perspective, Pitman, London.
- Boda pati and Naney (1998) People management :personal management and Human Resource –CIPD Training
- Boxall , Purcell and Wright (2007) Recruitment and selection-Gupea
- Construction Industry Development Board (2004) Construction industry development regulation
- Costello (2006) Assessment of recruitment practice on organization performance.

- Dale Wissman (2002) Human Resource in Malaysian construction industry
- David A.DeCenzo , Stehhen P.Robbins (2002) Human Resource Management
- Eze (2002) Assessment of recruitment practice on organization performance
- Eze (2002) Assessment of recruitment practice on organization
- Flipo (1982) Is there a long run relationship between Human Resource Management and employee productivity
- Herberg (1957) The job satisfaction – job performance relationship- Timothy A. judge
- Herzberg et al (1957) A handbook of Human Resource Management practice
- Huemann et al (2007) Human resource management in the project –oriented company : A review
- International Organization Labor (2001) ILO'S World Employment Report
- Kerzner,H. (2006) Project management :a systematic approach to planning , scheduling and controlling ,8th Edition
- Loosemore, M. (2000) Construction Crisis Management, American Society of Civil Engineers,
- Loosemore, M., Dainty, A., and Lingard, H., (2003) Human Resource in Construction Projects 'Strategic and Operational Approaches, Spon Press, London.
- McCabe (2007)Human resource management at work
- Ministry of work (November, 2003)
- Mullins, L. J. (1999) Management and Organizational Behaviour, 5th edn., Pitman, Essex.

- Naoum, S. G. (2001) People and Organizational Management in Construction, Thomas Telford, London.
- National Construction Council (NCC)(2004,2005)
- Offori, G. (1990) The Construction Industry, Aspects of its Economic and Management.
- Paul Hesry , Kenneth (1996) Management of organizational behavior : Utilizing Human Resource
- Pfeffer,J.(1997) Introduction to human resource management
- Pheng Low Sui and Chun Quek Tai (2006) Environmental factors and work performance of project managers in the construction industry , International Journal of project Management
- Project management for engineering and construction (Garold D. Oberlender , 2000)
- Project management institute (2013). A guide to the project management body of knowledge (PMBOK@Guide)-Fifth Edition
- Raymond (2011) Research on the theoretical model of SHRM
- Reid, J.L.,(2005) Contruction Limited –Officers (free information from companies house)
- Strassman, W.P., (1970) the construction sector in economic development, the Scottish Journal of Political Economy, Nov.
- Taylor ,S.(1988) Policies and practices towards older workers
- Truss (2001) Human resource management and resource based view of the firm
- Turin, D.A., (1973) The Construction industry: its Economic Significance and its Role of Development. 2nd Edition, University Collage Environmental Research Group London
- Walker, A. (2007) Project management in construction. Oxford, Blackcwell

- Werther, W. B. (1988) Human Resources and Personnel Management, Business Horizons.
- Windolf ,(1986) Recruitment Strategy
- Windolf(1986) Recruitment and selection – Gupeal
- Wolmar,(2008) Human Resource Management (HRM) in construction –Association of researchers in Construction Management
- www.designbuildings.co.uk
- www.globalbizresearch.org
- Zahra Alakoc Burma, Phd. Edu ,(2014) (Human Resource Management and its Importance for Today's Organization

APPENDICES

Sudan University of Science and Technology

College of Graduate Studies

Civil Engineering Department

M.SC.in Construction Management

The role of human resource management on attaining goals of a construction project in Sudan

Questionnaire

Please take a look at the following questions and try to answer correctly and accurately ,as many questions as possible. All information will be kept strictly confidential and will be used only for research and analysis .

Part(1): General information :-

1- What is your business?

-Contractor ☐

–Consultant ☐

-Client or client representative ☐

2-What is the type of sector you are working at ?

-Public ☐

-Private ☐

-Both ☐

3-How long have you been dealing with construction projects ?

0-5(years) ☐

6-10(years) ☐

11-15(years) ☐

More than 15 (years) ☐

4 -What is/are the size of project /projects you are working at ?

-Small ☐

- Medium ☐

-Large ☐

5-Level of education ?

-Diploma ☐

-Bachelor ☐

-Master Degree ☐

-PHD ☐

Part (2): Questions of the questionnaire :-

Mark the suitable option according to your point of view

Number	The Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	Recruitment and selection of qualified labors appear directly in the completion of the project on time.					
2.	Recruitment and selection of qualified labors reduce mistakes.					
3.	Recruitment and selection of qualified labors benefits the current labors of the company.					
4.	Recruitment and selection of qualified labors reduce the cost of reworking.					
5.	Recruitment and selection of qualified labors reduce the waste of material.					
6.	Recruitment and selection of qualified labors appear in the termination of the project with the expected cost.					
7.	The recruitment and selection of labors according to their experience .					
8.	The work of recruited and selected labors according to the specifications.					
9.	There is no reworking for the recruited and selected labors					
10.	If you feel that physical motivation (wage or otherwise) is insignificant or unfair the quality of the work will be declined.					
11.	If the management treats you poorly or not giving you enough respect , the level of your quality will be declined.					

12.	If you tell the managers about your suggestions or ideas for the development of the work or for solving problems at the company for example quality problems will be put in their consideration					
13.	Motivation affects your performance ,pushing you to accomplish your tasks on time					
14.	You consider yourself as a good labor , fulfilling your job properly in your company					
15.	The objective which the company's senior management aspires to reach are clear and understandable for you.					
16.	The company motivates the labors whom have not done mistakes.					
17.	Motivation helps in accomplishing the project with the expected cost .					
18.	Training improves the quality of the work.					
19.	Training enhances organization effectiveness and reputation					
20.	Supervisors give the labors chances to tryout training on their current jobs.					
21.	Training increases the awareness of the importance of time in the project.					
22.	Training helps employees doing their tasks on time					
23.	Training decreases the possibility of the project deviation from time.					
24.	Training decreases the expenditures in the project.					
25.	Training reduces accidents of work, which affects positively the cost of the project .					

Thank you very much for your cooperation

Table (1): shows the statistical analysis results for the affect of the recruitment on the time of a construction project.

	Sig-	**df**	**Chi-Square(a,b)**	**Std. Deviation**	**Median**	**Mean**
1	.00	3.00	97.00	.67	5.00	4.65
2	.00	3.00	68.56	.63	5.00	4.54
3	.00	3.00	31.00	.87	4.00	4.00

Table (2): shows the statistical analysis results for the affect of the recruitment on the cost of a construction project.

	Sig	**df**	**Chi-Square(a,b)**	**Std. Deviation**	**Median**	**Mean**
4	.00	3.00	40.11	.77	4.00	4.14
5	.00	3.00	57.89	.69	5.00	4.43
6	.00	3.00	23.67	.83	4.00	3.85

Table (3): shows the statistical analysis results for the affect of the recruitment on the quality of a construction project.

	Sig	df	Chi-Square(a,b)	Std. Deviation	Median	Mean
7	.00	3.00	40.78	.81	4.00	3.99
8	.00	3.00	24.56	.88	4.00	3.85
9	.00	4.00	31.75	1.01	3.00	3.17

Table (4): shows the statistical analysis results for the affect of the motivation on the quality of a construction project.

	Sig.	df	Chi-Square(a,b)	Std. Deviation	Median	Mean
10	**.00**	**4.00**	**23.14**	**1.13**	**4.00**	**3.64**
11	**.00**	**4.00**	**15.78**	**1.23**	**4.00**	**3.64**
12	**.00**	**4.00**	**70.78**	**.84**	**4.00**	**3.53**

Table (5): shows the statistical analysis results for the affect of the motivation on the time of a construction project.

	Sig	df	Chi-Square(a,b)	Std. Deviation	Median	Mean
13	**.00**	**4.00**	**76.61**	**.78**	**4.00**	**4.31**
14	**.00**	**3.00**	**73.89**	**.66**	**4.00**	**4.18**
15	**.00**	**4.00**	**65.22**	**.99**	**4.00**	**3.76**

Table (6): shows the statistical analysis results for the affect of the motivation on the cost of a construction project.

	Sig	df	Chi-Square(a,b)	Std. Deviation	Median	Mean
16	**.00**	**4.00**	**27.86**	**1.06**	**3.00**	**3.31**
17	**.01**	**3.00**	**12.33**	**.95**	**4.00**	**3.79**

Table (7): shows the statistical analysis results for the affect of the training on the quality of a construction project.

	Sig	df	Chi-Square(a,b)	Std. Deviation	Median	Mean
18	**.00**	**2.00**	**53.08**	**.49**	**5.00**	**4.69**
19	**.00**	**2.00**	**40.33**	**.55**	**5.00**	**4.61**
20	**.00**	**4.00**	**51.61**	**.91**	**4.00**	**3.65**

Table (8): shows the statistical analysis results for the affect of the training on the time of a construction project.

	Sig	df	Chi-Square(a,b)	Std. Deviation	Median	Mean
21	**.00**	**2.00**	**31.08**	**.58**	**5.00**	**4.53**
22	**.00**	**3.00**	**39.00**	**.78**	**4.00**	**4.29**
23	**.00**	**4.00**	**63.83**	**.82**	**4.00**	**4.19**

Table (9): shows the statistical analysis results for the affect of the training on the cost of a construction project.

	Sig	df	Chi-Square(a,b)	Std. Deviation	Median	Mean
24	**.00**	**4.00**	**59.11**	**.86**	**4.00**	**4.18**
25	**.00**	**3.00**	**53.22**	**.69**	**4.43**	**4.43**